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EVALUATION

impact of the CAP on biodiversity, soil and water (natural resources)

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Glossary

AECMs	Agri–environment-climate measures
AIRs	Annual implementation reports on the EAFRD
AKIS	Agricultural knowledge and innovation system
ANCs	areas facing natural or other specific constraints
BPS	Basic payment scheme
CAP	Common agricultural policy
CMEF	Common monitoring and evaluation framework
EAFRD	European Agricultural Fund for Rural Development
EFA	Ecological focus area
EIP	European Innovation Partnership for Agricultural Productivity and Sustainability
ENRD	European Network for Rural Development
ESPG	Environmentally sensitive permanent grassland
EU	European Union
EUR	Euro (currency of the Eurozone)
FADN	Farm Accountancy Data Network
FAS	Farm advisory service
GAECs	Good agricultural and environmental conditions
GHG	Greenhouse gas
HNV	High nature value
IACS	Integrated administration and control system
NGO	Non-governmental organisation
RDP	Rural development programme
SAPS	Single area payment scheme
SFS	Small farmers scheme
SMRs	Statutory management requirements
UAA	Utilised agriculture area

1. INTRODUCTION

1.1. Purpose and scope

The 2013 reform of the common agricultural policy (CAP) aimed to improve the targeting, efficiency and coherence of policy instruments by addressing the long-term objectives of (i) viable food production, (ii) sustainable management of natural resources and climate action and (iii) balanced territorial development (as set out in Article 110(2) of Regulation (EU) No 1306/2013, the 'Horizontal Regulation')[1].

Article 110(5) of the Horizontal Regulation obliges the Commission to present, by 31 December 2021, an assessment of the CAP's performance over the period 2014-2020. The **purpose** of this evaluation is to assess the impact that relevant CAP instruments and measures have had on biodiversity, soil and water and therefore to determine the extent to which they have helped achieve the overarching policy objective of sustainably managing natural resources[2].

The evaluation is particularly relevant in light of the objectives set out in the European Green Deal[3], notably the EU biodiversity[4] and farm to fork[5] strategies. The increased emphasis on agro-environmental targets, combined with the need for a resilient, safe and sustainable food system ensuring food security, requires a better balance between farming and nature. This means an EU farm sector that protects the environment, preserves biodiversity and provides access to healthy, affordable and sustainable food. At the same time, it also has to generate a fair economic return for farmers. The sustainable management of natural resources remains a key CAP general objective[6].

The **measures covered by the evaluation** include the full spectrum of relevant instruments set out in the basic 2014-2020 CAP Regulations on Direct Payments[7], Rural Development[8], the Common Market Organisation[9] and the Horizontal Regulation, which target the sustainable management of natural resources.

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1 Regulation (EU) No 1306/2013 of the European Parliament and of the Council of 17 December 2013 on the financing, management and monitoring of the common agricultural policy, OJ L 347, 20.12.2013, p. 549–607.

2 Complementing the evaluations of the greening and forestry measures of the CAP, and of the CAP's performance in achieving the objectives on 'climate action'. The evaluation of the CAP with respect to 'viable food production' and 'balanced territorial development' are covered in separate evaluations.

3 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

4 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/EU-biodiversity-strategy-2030_en.

5 https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en.

6 Three out of the nine key objectives of the European Commission proposal on the CAP for the period 2021-2027 address the environment and climate, notably environmental care, the preservation of landscapes and biodiversity, and climate change action. For more information, visit: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap/key-policy-objectives-future-cap_en.

7 Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy, OJ L 347, 20.12.2013, p. 608–670.

8 Regulation (EU) No 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD), OJ L 347, 20.12.2013, p. 487–548.

The **evaluation covers the geographical area** of the European Union of 28 Member States, including the United Kingdom, as it was a member of the EU during the 2014-2020 period evaluated[10]. The **evaluation period** corresponds to the implementation period of the 2014-2020 CAP, which started on 1 January 2015 for direct payments and 1 January 2014 for other measures. For analytical reasons, the evaluation uses the 2007-2013 period as reference.

The evaluation covers all **evaluation criteria**, assessing the effectiveness, efficiency, relevance, coherence and EU value added of the measures covered by the evaluation.

This Commission staff working document is **primarily based on the external evaluation support studies on biodiversity[11], soil[12] and water**[13] and the responses the Commission received to its **corresponding public consultation[14]**. It also draws on existing evaluations, including on payments for agricultural practices beneficial for the climate and the environment ('greening')[15], on forestry measures under rural development[16] and the impact of the CAP on climate change and greenhouse gas emissions[17]. The evaluation takes into account additional analysis and complementary data from various sources, as referenced throughout the document. In the subsequent chapters, any reference to analyses, interviews, findings, etc. comes from the support studies, unless otherwise indicated.

The **evaluation contributes to the assessment of the CAP's design and performance in addressing the objective** of sustainably managing natural resources, to ensure it remains fit for purpose. Its findings will also provide information on the Commission's support to the Member States in the ongoing development of their strategic plans for the next CAP period.

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9 Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products, OJ L 347, 20.12.2013, p. 671–854.

10 For the purposes of the evaluation, which covers the period 2014-2020, the United Kingdom is considered a member of the European Union (EU-28). The United Kingdom withdrew from the European Union on 1 February 2020, entering a transition period until 31 December 2020, during which Union law, with a few exceptions, continued to be applicable to and in the United Kingdom.

11 Alliance Environnement (2019) Evaluation support study on the impact of the CAP on habitats, landscapes, biodiversity. Brussels. https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/impact-cap-habitats-landscapes-biodiversity_en.

12 EEIG Alliance Environnement (2020) Evaluation support study on the impact of the CAP on sustainable management of the soil. Brussels. https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/impact-cap-sustainable-management-soil_en.

13 EEIG Alliance Environnement (2019) Evaluation support study on the impact of the CAP on water. Brussels. https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/impact-cap-water_en.

14 https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1951-Evaluation-of-the-impact-of-the-CAP-on-water/public-consultation.

15 SWD(2018)478 https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/payments-agricultural-practices-beneficial-climate-and-environment_en.

16 SWD(2019)389 https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/evaluation-staff-working-document-forestry-measures-under-rural-development_en.

17 SWD(2021)116 https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/key_policies/documents/ext-eval-soil-greenhouse-report_2020_en.pdf.

2. BACKGROUND TO THE INTERVENTION

2.1. Description of the intervention and its objectives

The 2013 CAP reform was designed to address the diverse **challenges facing the EU agri-food sector at the time. They were**:

- economic: food security and globalisation, a declining rate of productivity growth, price volatility, high input prices, deteriorating supply chain position of farmers;
- environmental: resource efficiency, soil and water quality, threats to biodiversity;
- territorial: demographic, socio-economic developments, challenges to rural areas.

The 2013 CAP reform took place in parallel to the discussions on the Europe 2020[18] strategy and negotiations on the 2014-2020 multiannual financial framework (MFF). Accordingly, **further factors driving the 2013 CAP reform** were to align the 2014-2020 CAP with the goals of the Europe 2020 strategy on smart, sustainable and inclusive growth, and to optimise the targeting and efficiency of CAP measures within the 2014-2020 EU budgetary framework of the MFF.

Thus, three **general objectives** were established **for the 2014-2020 CAP**:

- viable food production: with a focus on agricultural income, agricultural productivity and price stability;
- sustainable management of natural resources and climate action: with a focus on greenhouse gas emissions, biodiversity, soil and water;
- balanced territorial development: with a focus on rural employment, growth and poverty in rural areas.

The objectives are targeted by the two pillars of the CAP: pillar I on direct payments and market measures, financed by the European Agricultural Guarantee Fund (EAGF), and pillar II on rural development, financed through the European Agricultural Fund for Rural Development (EAFRD).

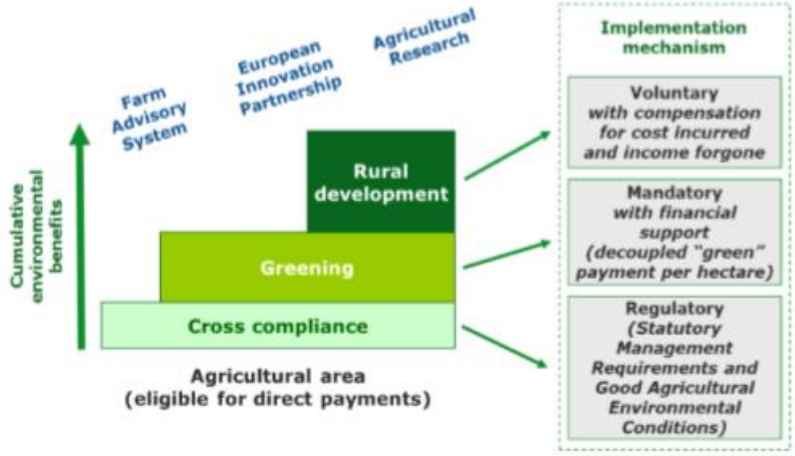
The environmental aspects of the CAP have been gaining prominence with subsequent reforms, given the **challenges facing the environment**. Over the last few decades, agricultural habitats, and to a lesser extent habitats in forests, have been in decline, primarily due to the effects of habitat conversion, farms specialisation and agricultural production intensification. Agriculture and forestry activities have an impact on soil quality, organic matter content, soil biodiversity and the balance of nutrients in soils, and these activities result in soil erosion, compaction, pollution and salinisation. The EU agricultural sector is dependent on the availability of water resources, but the sector also significantly affects the ecological, chemical and quantitative status of waterbodies. Agriculture remains one of the most significant pressures affecting the quality, quantity and hydromorphologicial status of waterbodies throughout the EU.

The CAP **objectives of sustainable management of natural resources** and climate action were aimed to support the headline biodiversity target of halting the loss of biodiversity and the degradation of ecosystem services in the EU by 2020 and restoring them as far as feasible. It responded in particular to target 3 of the biodiversity strategy to

[18] https://ec.europa.eu/eu2020/pdf/COMPLET%20EN%20BARROSO%20%20%20007%20-%20Europe%202020%20-%20EN%20version.pdf.

2020[19] which aimed to increase the contribution of agriculture and forestry to maintaining and enhancing biodiversity. Biodiversity activities include maintenance and improvement of landscape elements and support for the conservation of natural reserves and wetlands. Sustainable soil management activities in agriculture and forestry such as soil conservation, amendment, restoration, fertilisation and health can help to protect, restore and improve soil quality and safeguard its natural functions. The sustainable management of water in agriculture is gaining even greater importance in the context of climate change; and activities to limit pesticide/plant protection product use, reduce water consumption, increase water use efficiency, reduce runoff of nutrients are necessary to reduce the environmental impact of agriculture on water.

Figure 1 Support for environment and climate in the 2014-2020 CAP



Source: Directorate-General for Agriculture and Rural Development

The 2013 CAP reform introduced a **new combination of green support measures** (Figure 1) to address the pressures on natural resources and improve the environmental performance of EU agriculture. This new approach includes:

- a simplified and more targeted cross-compliance, representing the compulsory basic layer of environmental requirements and obligations from other legislation to be met in order to receive full CAP funding, including statutory management requirements (SMR) and good agricultural and environmental conditions (GAECs);
- green direct payments ('greening'), accounting for 30% of the national direct payment amount and rewarding farmers for applying three obligatory agricultural practices, namely maintenance of permanent grassland, ecological focus areas and crop diversification;
- a greater focus of the second pillar on sustainability, with an obligation of at least 30% of the budget of each rural development programme reserved for voluntary measures beneficial for the environment and climate (including agri–environment-climate measures (AECMs), organic farming, Natura 2000 and Water Framework Directive payments, forestry measures and investments)[20].

[19] https://ec.europa.eu/environment/nature/biodiversity/strategy_2020/index_en.htm.

[20] As well as payments for areas under natural constraints (ANC), which were found to make a limited contribution to environmental objectives.

To help farmers implement appropriate solutions for their specific situations, these complementary policy instruments are accompanied by related training measures and other support from the farm advisory system[21] as well as insights gained from the innovation partnership and applied research[22]. The CAP provides a comprehensive framework for addressing the objective of sustainable management of natural resources, and considerable flexibility for Member States to implement the various measures (as demonstrated in chapter 3).

Under **cross-compliance**, if farmers and other beneficiaries of CAP area-based support violate EU law on environmental, public and animal health, as well as animal welfare, their CAP support may be reduced. The scope of cross-compliance includes 'statutory management requirements' (SMRs), which are obligations covered by EU directives and regulations, such as the Directives on nitrates (Council Directive 91/676/EEC), on the conservation of wild birds (Directive 2009/147/EC) and on the conservation of natural habitats and of wild fauna and flora (Council Directive 92/43/EEC). The scope also includes standards for the good agricultural and environmental condition of land (GAECs), covering water, soil and carbon stock, biodiversity and landscape, as well as the minimum level of maintenance[23].

As for the aim of the **greening obligations under pillar I**, the crop diversification measure was aimed at improving soil quality; the maintenance of permanent grassland was aimed at supporting carbon sequestration and protecting biodiversity (habitats) in case of environmentally sensitive grasslands located in Natura 2000 areas; and dedicating 5% of arable land to areas beneficial for biodiversity (ecological focus areas - EFAs) was aimed at safeguarding and improving biodiversity on farms[24].

Pillar II objectives contributing to the sustainable management of natural resources and climate action (referred to as 'priorities for rural development') include[25]:

- restoring, preserving and enhancing ecosystems (priority 4), with focus areas 4A (restoring, preserving and enhancing biodiversity), 4B (improving water management), and 4C (preventing soil erosion and improving soil management);
- a resource-efficient, climate-resilient economy (priority 5), with focus areas 5A (increasing efficiency in water use by agriculture), 5D (reducing nitrous oxide and methane emissions from agriculture), and 5E (fostering carbon conservation and sequestration in agriculture and forestry).

Table 1 gives an overview of pillar II measures that are relevant for supporting the sustainable management of biodiversity, soil and water, among other objectives.

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21 The farm advisory system (FAS) helps farmers to better understand and meet the EU rules for environment, public and animal health, animal welfare and the GAEC. For further information, visit https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/income-support/cross-compliance/fas_en.

22 The European innovation partnership for agricultural productivity and sustainability (EIP-AGRI) was created to bridge the gap between innovative solutions by researchers and the uptake of new technologies by those living and working in rural areas. See https://ec.europa.eu/eip/agriculture/.

23 The list of SMRs and GAECs is provided in Annex 4: Tables and figures complementing chapter 2.

24 For more information, visit https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/income-support/greening_en.

25 For more information, visit https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/rural-development_en.

Table 1 EAFRD measures that may contribute to the sustainable management of natural resources

MEASURES	BRIEF DESCRIPTION
M10: Agri-environment-climate (AECMs)	This measure aims to preserve and promote 'agricultural practices that make a positive contribution to the environment and climate', by compensating beneficiaries for all or part of the additional costs and income foregone.
M11: Organic farming	The measure provides support to farmers that convert to or maintain organic farming practices and methods.
M12: Natura 2000 & Water Framework Directive	The measure provides annual per hectare compensation payments to farmers and foresters for the additional costs and income foregone resulting from the disadvantages of implementing the Birds and Habitats Directives or the Water Framework Directive.
M13: Payments to areas facing natural or other specific constraints (ANC)[26]	The measure provides support for farmers to pursue their farming activity in mountain areas and other areas facing natural or other specific constraints (as designated in Article 32 of Regulation (EU) 1305/2013). The support compensates farmers for the additional costs and income foregone resulting from the constraints to agricultural production.
M04:: Investments in physical assets	The investment grant is designed to improve the economic and environmental performance of holdings. This support covers investments that improve the overall performance and sustainability of farms, including non-productive investments linked to the achievement of agri-environment-climate objectives; etc.
M08: Investments in forest areas	Support under this measure concerns, among others, afforestation and creation of woodland, establishment of agroforestry systems, investments improving forest ecosystems' resilience and environmental value as well as their mitigation potential.
M15: forest-environment	This measure supports operations consisting of one or more forest-environment and climate commitments going beyond the relevant mandatory requirements established by the national forestry act or other relevant national law.
M01: Knowledge transfer and information actions	The measure aims to give farmers, forest holders, persons engaged in the food sector and rural small and medium-sized enterprises improved access to technical and economic knowledge and information. It should increase their competitiveness and improve their environmental performance, etc.
M02: Advisory services	Farm advisory services help farmers and other actors of rural areas to improve the sustainable management and overall performance of their holding (modernisation, competitiveness, sectoral integration, market orientation, innovation, etc.).
M16: Cooperation	This measure promotes various forms of cooperation involving at least two entities, including support for the establishment and operation of operational groups of the European Innovation Partnership for agricultural productivity and sustainability.
M07: Basic services and village renewal in rural areas	Support under this measure concerns small-scale infrastructure and covers, among others, management plans relating to Natura 2000 sites and other areas of high nature value, studies and investments associated with the maintenance, restoration and upgrading of high nature value sites, including environmental awareness actions, increasing the environmental performance of the settlement.

[26] Member States could allocate up to 5% of their national ceiling for an additional voluntary payment to farmers who are entitled to the basic payment and whose holding is located in areas with natural constraints. The payment is granted per eligible hectare in order to offset the additional costs of farming in disadvantaged areas. All Member States use the scheme targeting these areas in their rural development programmes, except for Denmark and Slovenia who implement it in pillar I.

The agri-environment-climate measure (AECM) is a key policy measure used in favour of biodiversity and landscapes, compensating farmers (and sometimes other land managers) for the additional costs and income losses they incur when they voluntarily undertake agricultural practices that deliver environmental benefits (beyond the beneficiary's already existing obligations).

The practices funded by AECM are very wide-ranging and include cultivation practices, farm management, irrigation/ drainage, management of inputs, management of landscape, habitats, grassland, high nature value farming, etc. AECM practices have more demanding and targeted management requirements (e.g. use of appropriate mixes of species) than what is required under cross-compliance, the system of green direct payments and any other sources of relevant obligations.

A number of **CAP instruments and measures not designed to address the natural resource objective** have indirect implications on sustainable management.

These include area-based decoupled direct payments, coupled payments and the operational programmes for fruits and vegetables under the common market organisation (Regulation (EU) No 1308/2013).

The aim of **basic direct payments (BPS/SAPS)** for the management of natural resources is not stated clearly in the legislation, but they help keep afloat less profitable holdings that have practices beneficial for the environment (e.g. highly diversified holdings, extensive grazing systems, etc.). Basic direct payments can be of different amounts depending on the Member State/ region and the historical level of entitlements.

Voluntary coupled support is based on fixed areas, type of crops grown, and yield and/or numbers of animals, and can be provided to sectors facing particular situations where specific types of farming or specific agricultural sectors are particularly important for economic, environmental or social reasons. The sectors most supported include beef and veal, dairy products, sheep and goat meat, and protein crops.

Regulation (EU) No 1308/2013 set up a common organisation of the markets in agricultural products, establishing support measures among other things, for the olive, fruit and vegetables, and wine sectors. In accordance with the Regulation, **operational programmes for the fruit and vegetable sector** need to include two or more environmental actions, and at least 10% of the expenditure under operational programmes has to cover environmental actions.

Outside the CAP, a body of **EU environmental legislation and policy instruments (not specific to agriculture)** set objectives and requirements for the sustainable management of natural resources (by setting objectives and requirements), in line with the 7th environmental action programme that guided the EU's environment policy until 2020[27].

Regarding biodiversity, the Birds Directive (2009/147/EC) and the Habitats Directive (92/43/EEC) are the cornerstone of the EU's legal framework for the conservation and restoration of natural habitats and species of wild fauna and flora. Additionally, the EU biodiversity strategy to 2020[19] aims to halt the loss of biodiversity and the degradation of ecosystem services by supporting the EU Nature Directives' full implementation and by

[27] https://ec.europa.eu/environment/action-programme/.

increasing the contribution of agriculture and forestry to maintaining and increasing biodiversity.

The Water Framework Directive (2000/60/EC) is the most comprehensive and overarching instrument of EU water policy. It aims to protect all surface and groundwater bodies, including transitional and coastal waters, and addresses all pressures (including agriculture). Its aim is to achieve overall good ecological status (or its potential) and good chemical status for all surface water bodies, and good chemical and good quantitative status for all groundwater bodies by 2015, or by justified extension to 2027[28]. Preventing deterioration is also a key aim of the Directive.

Other directives with relevance for agriculture that affect mainly water quality are the Nitrates Directive (91/676/EC), the Sustainable Use of Pesticides Directive (2009/128/EC), the EU Drinking Water Directive (98/83/EC), the Groundwater Directive 2006/118/EC), the Environmental Quality Standards Directive (2008/105/EC) and the EU Floods Directive (2007/60/EC) for water quantity[29].

There is no specific EU legal framework for soil protection. It is addressed through the soil thematic strategy[30] but in a non-binding way. The soil thematic strategy aims to protect and sustainably use soils by preventing further soil degradation, preserving its functions and restoring degraded soils. The soil thematic strategy will be updated in 2021. Other pieces of EU legislation setting requirements relevant for soil include the Land Use, Land Use Change and Forestry (LULUCF) Regulation (EU) 2018/841, the Sewage Sludge Directive (86/278/EEC) and regulations on fertilisers[31], mercury[32] and plant protection products[33].

Figure 2 presents the intervention logic of the relevant CAP measures addressing the impact of the CAP on natural resources. The measures are described in Heading 3, along with the state of play for their implementation.

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28 For surface waters to be considered 'good', the water body must have good ecological and good chemical status. For groundwater bodies to be considered 'good', they must have good chemical and good quantitative status. Explained in Figure 2 in the Water Fitness Check - SWD(2019)439.

29 A comprehensive evaluation of most of these directives was performed in the fitness check of the water policies. See Water Fitness Check - SWD(2019)439.

30 https://ec.europa.eu/environment/soil/three_en.htm.

31 Regulation (EC) No 2003/2003 of the European Parliament and of the Council of 13 October 2003 relating to fertilisers, OJ L 304, 21.11.2003, p. 1–194.
Regulation (EU) 2019/1009 of the European Parliament and of the Council of 5 June 2019 laying down rules on the making available on the market of EU fertilising products and amending Regulations (EC) No 1069/2009 and (EC) No 1107/2009 and repealing Regulation (EC) No 2003/2003, OJ L 170, 25.6.2019, p. 1–114.

32 Regulation (EU) 2017/852 of the European Parliament and of the Council of 17 May 2017 on mercury, and repealing Regulation (EC) No 1102/2008, OJ L 137, 24.5.2017, p. 1–21.

33 Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, OJ L 309, 24.11.2009, p. 1–50.

2.2. Baseline and points of comparison

The Commission legal proposals for the 2013 CAP reform were accompanied by an impact assessment[34], which described the situation preceding the reform and included medium-term projections comparing no policy change (status quo / baseline) with policy alternatives. However, the medium-term projections are insufficient as a baseline for the purposes of this evaluation, as they do not correspond to the final outcome of the reform after negotiations with the European Parliament and Council.

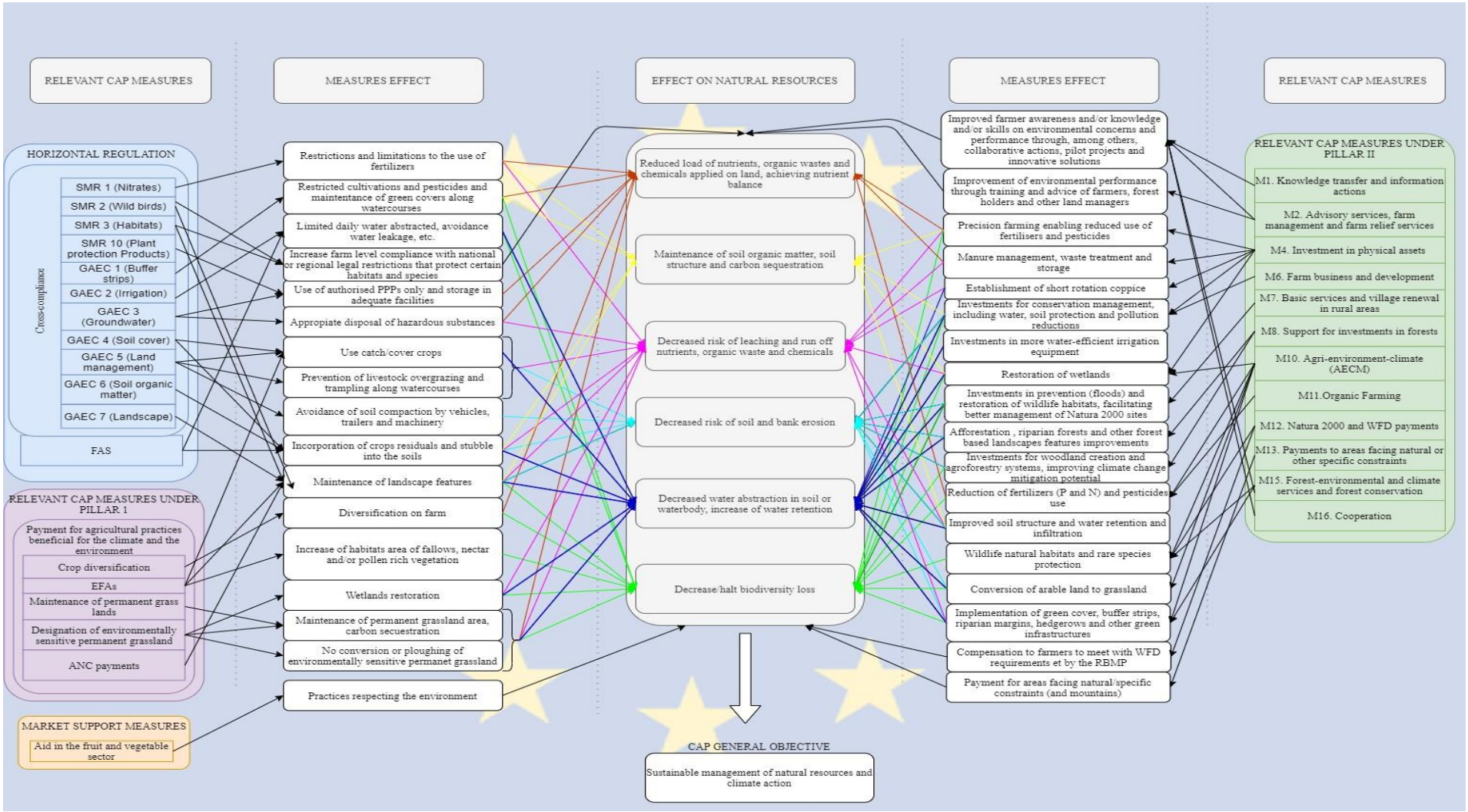
As there were no other objective and quantitative projections that could have been used as a baseline, the points of comparison are based on the situation before the implementation of the 2014-2020 CAP, using the most recent data up to 2013, presented in *Annex 5: Benchmark: the situation prior to the 2014-2020 CAP*[35].

A further proxy for the performance of the CAP are the fulfilment of target indicators set for relevant focus areas of rural development programmes (presented in chapter 5).

[34] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52011SC1153.

[35] On the basis of available data on relevant CAP indicators from the online agri-food data portal https://agridata.ec.europa.eu/extensions/DashboardIndicators/DataExplorer.html?select=EU28_FLAG,1
Details and explanations are available via https://ec.europa.eu/info/sites/info/files/food-farming-fisheries/farming/documents/cap-context-indicators-table_2014_en.pdf.

Figure 2. Illustration of the intervention logic of the CAP measures related to natural resources



Source: Directorate-General for Agriculture and Rural Development

3. IMPLEMENTATION / STATE OF PLAY

3.1. Description of the current situation

In 2019, 151 million hectares (84%) of all EU agricultural land were supported under the direct payment scheme and therefore subject to the requirements for compliance with SMRs and the relevant practices that Member States have established under GAECs[36]. Also in 2019, 142.3 million hectares (80%) of agricultural land were declared by farmers applying at least one greening obligation, 26.7 million hectares (15%) were supported under payment for agri-environment-climate commitments and 9.4 million hectares (5%) were under organic farming[37].

3.1.1. Good agricultural and environmental conditions (GAECs)

Member States have translated the core obligations of the GAECs in different ways, fitting their own circumstances.

GAECs directly addressing water

Under GAEC 1 (buffer strips), all Member States set a requirement for establishing buffer strips along watercourses/waterbodies with no application of fertilisers. The minimum width spanned from less than 1 meter to more than 20 meters, with the strong majority of Member States setting buffer strips with a width ranging from 1 to 5 meters[38]. Member States differed in how they defined watercourse/water body where buffer strips are required, from more generic to specific definitions and lists. Flanders-Belgium, Croatia, Czechia, France and Spain also supplemented the basic requirement with a ban on the use of plant protection products on buffer strips, and Austria, Greece, Italy and Portugal banned tillage and/or cultivation.

GAEC 2 (irrigation) links CAP payments and the procedure defined by Member States for obtaining an authorisation/permit to use water for irrigation. The procedure (and therefore GAEC 2) is not applicable in Ireland and Luxembourg[39].

Under GAEC 3 (groundwater), which is applied in all Member States, CAP payments are linked to the provisions on the direct/indirect discharge of the listed dangerous substances into groundwater.

GAECs targeting soil and soil organic matter

Under GAEC 4 (soil cover), all Member States require minimum soil cover. There is a particular focus on areas with a high risk of erosion, and there are time-specific rules. Member States have differed in the way they identify land under the obligation: the majority used only a general specification (agricultural area, grasslands, parcels), while Cyprus, Czechia, Greece, Latvia, Malta and Poland specified arable land and France, Germany and Spain fallow land. The approach for soil cover also differed. Only Belgium (Flanders and Wallonia) and Czechia required crop residues/stubble. and only Austria, Cyprus, Denmark, Estonia, Finland, Germany, Lithuania, Luxembourg, the Netherlands,

[36] CMEF indicator OIH_01_1a Cross-compliance.

[37] CMEF indicator OID_05 Greening, OIR_06_1.1 AECM and OIR_06_1.2 organic farming.

[38] Austria, Flanders (Belgium), Bulgaria, Cyprus, Estonia, Latvia, Poland, Portugal and Slovenia set buffer strips exceeding 5 meters.

[39] In Ireland and Luxembourg it is not applicable as no irrigation and thus no water authorisation procedures exist.

Portugal, Spain and Sweden required permanent grassland/grass/green cover. On the other hand, Croatia, France, Greece, Hungary, Ireland, Italy, Latvia, Malta, Romania, Poland, Slovakia and Slovenia allowed farmers to choose their soil cover from one of the two options mentioned. Germany and France set additional rules prohibiting bare fallow or restricting the use of plant protection products and fertilisers.

Under GAEC 5 (minimum land management reflecting site specific conditions to limit erosion), the main measures set by Member States tackled land with high slopes usually defined as more than a 10% slope. The majority of Member States have cultivation requirements (transversal to the contour of the slope and minimal tillage). However, Wallonia (Belgium), Czechia, Hungary, Lithuania, Portugal and Slovakia limit crops to be planted (crops with small canopy, e.g. potato), and Flanders (Belgium), Denmark and France ban ploughing during a certain period (generally winter).

All Member States implement the main measure of the ban on stubble burning under GAEC 6 (maintenance of soil organic matter). In order to improve the soil carbon content, a few Member States go beyond this core requirement by requiring (i) a soil analysis with possible corrective actions (Luxembourg), (ii) soil coverage with nitrogen-fixing crops (Czech Republic), (iii) the incorporation of crop residues (Cyprus), (iv) crop rotation (Slovenia; Malta) and (v) a ban on cultivation in species-rich and semi-natural habitats.

GAECs targeting biodiversity

GAEC 7 (landscape) targets the retention of landscape features, and includes a ban on cutting woody landscape features and measures for preventing the introduction and spread of invasive alien plants. In terms of retention of landscape features, Member States differed as to the type and number of features subject to protection. The majority (25) of Member States selected mainly the nine landscape features suggested in the legislation (hedges, ponds, ditches, trees in line, group of trees, isolated trees, field margins, terraces and traditional stonewalls) that are considered as essential to preserve biodiversity. However, Latvia and Austria selected only elements that are not on the suggested list such as protected trees and natural monuments, and the Netherlands did not select any element for protection.

3.1.2. Statutory management requirements (SMRs)

Under SMR 1 (nitrates), Member States are required to establish a programme of actions which is compulsory in nitrate vulnerable zones and whose items are verified under cross-compliance. The measures that Member States must implement in these areas are those already included in the Codes of Good Agricultural Practice set out in the Nitrates Directive and other measures such as limiting fertilizer application (mineral and organic), taking into account crop needs, all nitrogen inputs and soil nitrogen supply and setting a maximum amount of livestock manure that can be applied. Member States are therefore required to identify specific vulnerable zones and set up and operate action programmes.

SMR 2 (wild birds) and SMR 3 (habitats) target biodiversity, as Member States are under the obligation to protect certain landscape features under the Birds and Habitats Directive. As such, these SMRs help to enforce farm-level compliance with national or regional legal restrictions that protect certain habitats and species covered by the Nature Directives.

SMR 10 (plant protection products) targets water and soil protection, as it requires farmers to apply the principles of good plant protection practices (set out under

Article 55 of Regulation 1107/2009[40]) and comply with market authorisations on the use of plant protection products.

3.1.3. Greening

The greening measures target in particular soil quality (crop diversification), biodiversity (ecological focus area (EFA) and environmentally sensitive permanent grassland) and the preservation of carbon stocks in agricultural soils (permanent grassland, environmentally sensitive permanent grassland). No specific measure directly addresses water quality or quantity. However, specifications for some of the EFA elements consider the impact on and/or contribute to improved water management, i.e. buffer strips, catch crops and nitrogen-fixing crops, ban on the use of pesticides on fallow land and productive EFA areas. Further impacts are also linked to preservation of permanent grasslands or positive effects stemming from greater crop diversity.

The greening rules do not apply to farmers who opted for the small farmer's scheme (2.1% of UAA in 2019), for administrative and proportionality reasons. Organic farmers (7.9% of UAA in 2019) automatically receive a greening payment for their farm, as they are considered to provide environmental benefits by the nature of their work[41].

Crop diversification

In 2019, 74% of the EU arable land fell under the crop diversification obligation (77.7 million hectares). Of the farms applying the crop diversification, 87% of arable land was under the obligation to have at least three crops and the remaining 13% under the obligation to have at least two crops, though the figures differ at Member State level depending on the average size of the arable land of farms. While 6 Member States (Bulgaria, Estonia, France, Latvia, Slovakia, United Kingdom) had 95% or more of arable land under three crop obligation, 3 Member States had around half (Slovenia, Finland) or more (Greece) of their arable land under two crops. In the case of Malta, farms had only a two crop rule.

Permanent grassland

In 2019, 51.7 million hectares of permanent grassland were declared under the direct payment scheme and the area of permanent grassland under the greening ratio obligation amounted to 46.7 million hectares. The figures under the greening ratio do not include the exempted areas of the small farmer scheme and organic producers.

The overall share of permanent grassland in agricultural areas under greening was 31.6% in 2019, ranging from 2.4% in Cyprus (2019) to 89.9% in Ireland (2018). The reconversion mechanism was activated four times in two Member States (Cyprus: 2015 and 2016, Estonia: 2016 and 2018) to reverse a more than 5% drop in the annual ratio against the 2015 reference ratio.

Environmentally sensitive permanent grassland (ESPG)

ESPG designation entitles stricter protection of grassland parcels in order to meet the objectives under the Natura 2000 Directives. In 2019, of 16.6 million hectares of

[40] Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC, OJ L 309, 24.11.2009, p. 1–50.

[41] On the basis of CMEF indicators OID_13 Small farmers' scheme (OID_13_2) and C.19 Agricultural area under organic farming (CTX_SEC_19_2).

permanent grassland in Natura 2000 areas, 9.3 million hectares (56%) were designated as ESPG and 5.7 million hectares (34%) declared by farmers. This translates into 17% of all permanent grassland in EU designated as ESPG (ranging from 0.2% in Portugal to just over 57% in Cyprus).

These figures reflect the differences in the delineation/selection of Natura 2000 areas when implementing the underlying Nature and Birds Directives and the differences in Member States' decisions to designate permanent grassland within the Natura areas. Eight Member States (Bulgaria, Czechia, Greece, Italy, Hungary, Netherlands, Slovakia, Finland, Sweden) designated all permanent grasslands within Natura 2000 as ESPG, while others designated only a proportion. The lowest proportion of permanent grassland in Natura 2000 areas designated as ESPG in 2019 was in Portugal (1.3%) and Ireland (4.0%). ESPG declared by farmers ranged from 0.1% of permanent grassland in Natura 2000 in Portugal and 2% in Austria to 100% in Greece and in Sweden.

Four Member States (Belgium, Czechia, Italy, Latvia) also designate permanent grassland outside Natura 2000 areas as ESPG, adding protection to an additional 0.6% of all EU permanent grasslands.

Ecological focus area (EFA) obligation

In 2019, 69% of EU arable land fell under the EFA obligation (72.4 million hectares). The selection of EFA areas and features differed across Member States, with some opening the whole range of EFA types and others only a narrow range. A major change from 2018 onwards came from the amendments to the Omnibus Regulation[42] where three EFA types were added and weighting factors increased for nitrogen-fixing crops and short rotation coppice. A major change also came from the amendments to the delegated legislation that restructured some landscape features' EFA types and banned the use of plant protection products on fallow land and productive EFA types. In 2019, 9.5 million hectares were declared EFA areas, representing 13.7% of arable land under obligation.

Table 2 Areas under EFA before applying weighting factors (to nearest 000)*

	Land lying fallow and land lying fallow melliferous	Landscape features, terraces	Buffer strips, field margins, strips along forest edges	Afforested areas, agroforestry, Short rotation coppice, Miscanthus, Silphium	Catch crops	Nitrogen-fixing crops	**Total**
2015	2 508 000	160 000	96 000	74 000	3 952 000	3 774 000	**10 561 000**
Share in total EFA	24%	1.5%	1%	1%	37%	36%	**100%**
2019	1 851 000	182 000	96 000	38 000	5 171 000	2 208 000	**9 542 000**
Share in total EFA	19%	1.9%	1%	0.4%	54%	23%	**100%**

*Structure further to changes introduced by Omnibus Regulation and the 2017 delegated legislation

In terms of uptake by farmers, the most frequently declared EFA types were those linked to productive or potentially productive EFAs: nitrogen-fixing crops, catch crops and land lying fallow. In 2019 catch crops areas represented just over half and the nitrogen-fixing crops areas just below a quarter of all. The share of fallow land was a fifth of all EFA areas. The EFA types that are most valuable for the environment (i.e. landscape features) account for less than 2% of the area under EFA, whereas the EFA type that provides the

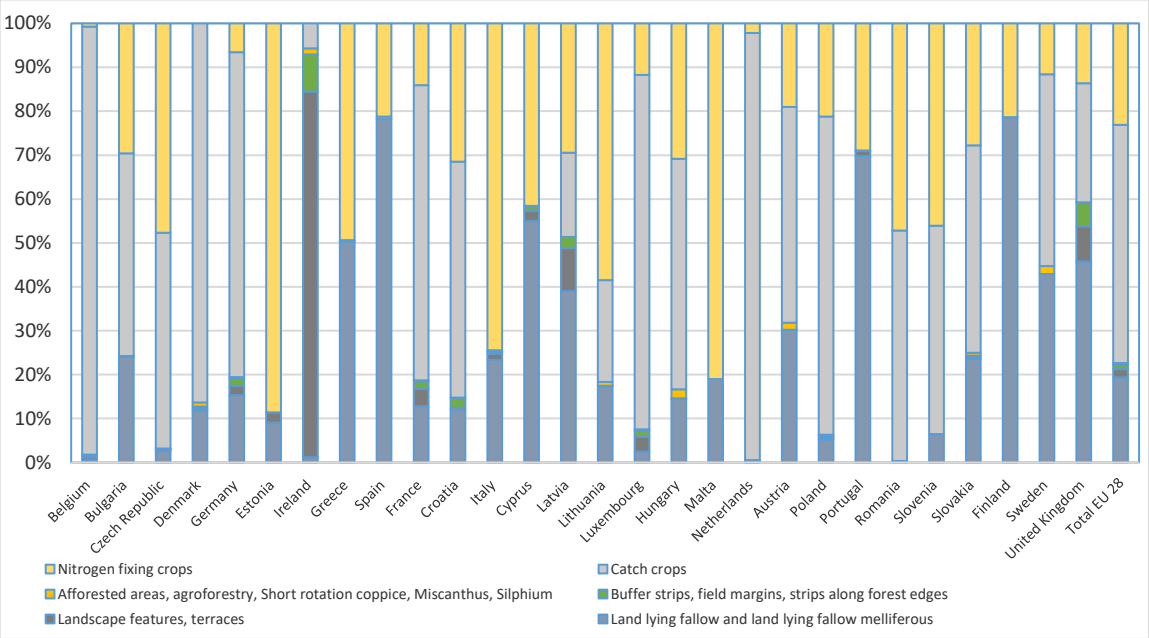
[42] Regulation (EU) No 2017/2393; O.J. L 350, 29.12.2017, p. 15-49.

lowest benefits for biodiversity, nitrogen-fixing crops, is one of the types that is frequently chosen (representing 23% of the area).

Analysis of the EFA composition in Member State in 2020 (Figure 3) revealed the following patterns:

- 5 Member States had at least 50% of fallow land, of which 2 had more than 75%;
- 10 Member States had at least 50% of catch crops of which 4 had more than 75%;
- Altogether, 15 Member States had more than 80% of EFAs dedicated to nitrogen-fixing crops or catch crops;
- In 6 Member States, landscape features, buffer and other strips and forestry-related areas accounted for more than 3% of all EFAs.

Figure 3 Main types of EFA area in 2019, before applying the weighting factors



Source: Directorate-General for Agriculture and Rural Development, based on Member States´ notifications

After applying the weighting factors, nitrogen-fixing crops and catch crops account for above half of the total weighted EFAs in 2019, representing 6-7% of the arable land under the obligation and contributing to overshooting the required 5% at farm level.

Table 3 Areas under EFA after applying weighting factors (to nearest 000)*

	Land lying fallow and land lying fallow melliferous	Landscape features, terraces	Buffer strips, field margins, strips along forest edges	Afforested areas, agroforestry, Short rotation coppice, Miscanthus, Silphium	Catch crops	Nitrogen	**Total**
2015	2 508 000	323 000	128 000	58 000	1 186 000	2 642 000	**6 842 000**
Share in total EFA	37%	4.7%	2%	1%	17%	39%	100%
2019	1 864 000	425 000	212 000	29 000	1 552 000	2 208 000	**6 287 000**
Share in total EFA	30%	6.8%	3%	0.5%	25%	35%	100%

*Structure further to changes introduced by the Omnibus Regulation and the 2017 delegated legislation
Source: Directorate-General for Agriculture and Rural Development

Table 4 Weighted EFA areas as a share of arable land under the EFA obligation (to nearest 000)*

	Land lying fallow and land lying fallow melliferous	Landscape features, terraces	Buffer strips, field margins, strips along forest edges	Afforested areas, agroforestry, Short rotation coppice, Miscanthus, Silphium	Catch crops	Nitrogen fixing crops	**Total**
2015	3.3%	0.4%	0.2%	0.1%	1.6%	3.5%	**9.1%**
2019	2.6%	0.6%	0.3%	0.04%	2.1%	3.0%	**8.7%**

*Structure further to changes introduced by Omnibus Regulation and the 2017 delegated legislation
Source: Directorate-General for Agriculture and Rural Development

3.1.4. Rural development measures (supported by EAFRD)

The rural development policy of the CAP is implemented over a seven-year period through rural development programmes (RDP) designed by national or regional managing authorities. A total of 118 RDPs are implemented in the 28 Member States, with EUR 99.6 billion in funding over the 2014-2020 period. After co-funding by national, regional and private resources is added, the rural development policy of the CAP has a total of EUR 161 billion in funding.

Table 5: Measures programmed (total public) under priorities 4 and 5

	Priority 4		Priority 5		Share of the measure programmed under priorities 4 and 5[43]
Measures	EUR million	%	EUR million	%	
M01 Knowledge transfer/information	363	1%	125	1%	34%
M02 Advisory services	305	0.4%	62	0.6%	46%
M04 Investments in physical assets	2 119	3%	4 767	50%	20%
M06 Farm business and development		0%	146	2%	2%
M07 Basic services and village renewal	1 398	2%	258	3%	16%
M08 Forest investments	3 055	4%	2 487	26%	92%
M10 Agri-environment-climate	24 021	35%	1 193	12%	100%
M11 Organic farming	11 549	17%	131	1%	100%
M12 Natura 2000 and WFD	808	1%	7	0%	100%
M13 Areas facing natural constraints	24 226	35%	221	2%	97%
M15 Forest-environment-climate	286	0.4%	3	0%	100%
M16 Cooperation	427	1%	208	2%	25%
Total	68 558	100%	9 608	100%	52%

Source: Directorate-General for Agriculture and Rural Development

At EU level in the period 2014-2020, Member States allocated 46% (almost 69 billion euros) of their rural development budgets to restoring, preserving and enhancing ecosystems (priority 4) and over 5% (9 billion euros) to a resource-efficient, climate-resilient economy (priority 5). This amounts to a total of almost 77 billion euros,

[43] This column refers to the % of the budget allocated to CAP measures and instruments that were under priorities 4 (preserving and enhancing ecosystems) and 5 (a resource-efficient, climate-resilient economy).

i.e. 51% of all rural development funding spent by Member States[44]. At the end of September 2020, the EU-28 had executed 76% of the planned public expenditure under priority 4 and 46% under priority 5.

Under priority 4, support for ANC (M13) accounted for 35% of all spending, with AECMs (M10) a further 35%, organic farming 17% and forestry measures 5%. Under priority 5, the main measures are physical investments (M4) with 50%, forestry measures (M8) with 26% and AECM with 12% of total allocations[45].

This spending on AECM and organic farming has resulted in covering more than 40 million hectares for AECM and organic farming (23% of UAA), with a number of different practices implemented to address the environmental impact of the CAP.

Table 6. Example of practices supported under RDP addressing natural resources

Conservation of grassland	Conservation of landscape elements	Crop diversification & rotation
Organic farming	Maximum livestock density	Other limitations of pesticide use
Intermediate crop/cover crops/catch crops	Buffer strips along superficial water bodies	Erosion protection on permanent crops

Source: Directorate-General for Agriculture and Rural Development

3.1.5. Other measures

Knowledge exchange plays a key role in helping farmers and rural communities meet the challenges of natural resources, mainly through knowledge transfer and information actions (M1), advisory services (M2) and cooperation (M16).

At present, all countries in the European Union have to have a farm advisory system (FAS). The FAS helps farmers to better understand the EU rules for environment, public and animal health, animal welfare and the good agricultural and environmental condition (GAEC). The FAS itself is not an instrument (in practice it may be a telephone helpdesk or a website with important information) and does not provide funding. Several Member States and regions provide support from EAFRD (M2-Advisory services) to facilitate the implementation of the FAS (Belgium- Flanders, Estonia, Italy, Lithuania, Malta, Portugal, Slovakia and UK-Scotland).

The European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI) was set up to encourage innovation in agriculture and rural communities. Thanks to innovative solutions created through the interaction of a mix of relevant competent actors, including the end-users of the outcomes, the EIP speeds up innovation. Of the more than 3 000 projects planned for 2014-2020, more than 2 000 were already finished or running at the end of 2021, and extra calls are planned.

[44] For a comprehensive overview of key facts and figures on priority 4, visit https://enrd.ec.europa.eu/sites/enrd/files/priority-4-summary.pdf.

[45] For a comprehensive overview of key facts and figures on priority 5, visit https://enrd.ec.europa.eu/sites/enrd/files/priority-5-summary.pdf.

The operational group projects of the EIP follow the interactive innovation model[46] and 65% of them work on environment-climate issues, of which 42% on biodiversity, soil and water and another 10% on landscape/landscape management. Around the (farmer) partners in the operational group, a circle of up to 100 farmers are co-learning peer-to-peer by attending the project's activities.

Some Member States even started using operational groups as a test bed for preparing agri-environmental measures with great success. It works as an early promotion for a ready to use measure and - more importantly - creates co-ownership and trust in the measure for the future beneficiaries.

The inclusion of advisors in operational group projects strengthens the Agricultural Knowledge and Innovation System (AKIS) by helping set up and implement innovative projects. The inclusion and environmental training of impartial and trusted advisors within the AKIS should have an important impact on farmers' environmental behaviour.

3.1.6. Reporting on infringements/problems

To enforce cross-compliance, beneficiaries who do not comply fully with requirements and standards of cross-compliance have to pay a penalty, which is applied as percentages to their overall CAP payments

Farmers who do not respect greening rules receive less money. Such reductions reflect the number of hectares identified as non-compliant, taking into account the nature of the greening requirement. Since 2017, national governments can impose administrative penalties on top of the reduction in greening payments. Administrative penalties have to be proportionate, depending on the severity and scope of the non-compliance. Details of the control/sanctions system is provided in *Annex 6: Information complementing chapter 3*.

On the basis of 2019 data, infringement rates with no sanction for cross-compliance remained marginal (0-1%) in the overwhelming majority of Member States/regions. In a very few cases, a more considerable rate was found:

- SMR 1 (nitrates): 11% in the UK, 9% in Sachsen-Anhalt (Germany), 8% in Estonia;
- SMR 2 (wild birds): 13% in La Rioja (Spain), 10% Asturias (Spain), 9% in Navarra (Spain);
- GAEC 2 (irrigation): 18% in Wallonia (Belgium);
- GAEC 3 (groundwater): 4 to 17% in various regions of Italy;
- GAEC 4 (soil cover): 6-14% in select regions of Spain;
- GAEC 5 (soil erosion): 18% in Flanders (Belgium).

The error rate for direct payments was very low during the 2014-2020 period, under 2% every year.

[46] Collaboration between various actors to make best use of complementary types of knowledge (scientific, practical, organisational, etc.) in view of co-creation and the quick spreading of solutions/ opportunities which are ready to be implemented in practice. This innovation model creates co-ownership by farmers, and thus results in easier uptake and broader dissemination than any other innovation project.

The adjusted error rate for the total relevant expenditure for all RDP measures was 2.92% for the 2014-2020 period, with approximately half of all paying agencies (71 in total) producing an error rate above 2%. In 2019, measures relevant for the sustainable management of natural resources, notably M10 (AECM), M11 (organic farming), M12 (Natura 2000 and Water Framework Directive) and M13 (ANC) showed a very low error rate of 2.55% for the EU as a whole. However, in some cases a more considerable (commitments) error rate was observed:

- M10 (AECM): above 5% in 15 regions (of Belgium, Bulgaria, Germany, Spain, Greece, Croatia, the Netherlands and Slovakia);
- M11 (Organic farming): above 5% in 5 regions (of Bulgaria, Germany, Spain and Slovakia);
- M12 (Natura 2000 and Water Framework Directive): above 5% in 2 regions (of Spain and Luxembourg);
- M13 (ANC): above 5% in 1 region (of Italy).

4. METHOD

The evaluation is **primarily based on the external evaluation support studies on biodiversity, soil and water** and the responses to the **corresponding public consultation**. It also draws on the evaluations on payments for agricultural practices beneficial for the climate and the environment, on forestry measures under rural development and the impact of the CAP on climate change and greenhouse gas emissions. The evaluation is also informed by additional analysis and complementary data from various sources, including publications by the European Parliament and the European Court of Auditors.

4.1. Short description of methodology

The methodological approach combines theoretical and empirical analysis and includes a variety of quantitative and qualitative methods to deal with the complexity and the wide range of topics under the evaluation.

The starting point of the external studies on biodiversity, soil and water was the development of the **intervention logic** for the CAP instruments and measures to identify their potential direct and indirect impacts on the three themes.

The evaluation **tools and methods** included, but were not limited to: documentary research, literature reviews, statistical data analysis, case studies surveys and interviews with stakeholders as part of the three studies, public consultation, etc. The collected data was analysed through both quantitative and qualitative methods.

The databases utilised in the evaluation study included: annual implementation reports on the EAFRD (AIRs), the Clearance Audit Trail System (CATS), common monitoring and evaluation framework indicators (CMEF), the European Soil Data Centre (ESDAC), Eurostat agri-environmental indicators (AEI), the Farm Accountancy Data Network (FADN), the Farm Structure Survey (FSS), the Land Use and Cover Area frame Survey (LUCAS), the Water Information System for Europe (WISE), etc. The **indicators** used included among others, context, output, result and target indicators from the CMEF for biodiversity, soil, water and the environment in general, the Streamlining European Biodiversity (SEBI for biodiversity), indicators from the Sustainable Forest Managements (SFM), WISE, etc..

The case studies selected for the three studies provide insight into the implementation and effect of the instruments and measures, covering as much as possible the variety of contexts across the EU. Case studies have been selected in such a way that the relevant water, soil and biodiversity-related issues can be covered efficiently and clearly, representing the diversity of scenarios of the EU. The case studies included, but were not limited to: stakeholder consultations through semi-structured interviews, documentary research including literature reviews, statistical data collection at national, regional and local level, and complementary interviews. The selection criteria and resulting case studies are presented in *Annex 3: Methods and analytical models.*

A **public consultation** was conducted on the European Commission's EU Survey platform between 9 July and 22 October 2020, collecting 183 responses from 25 Member States[47] and Israel.

4.2. Limitations and robustness of findings

The evaluation is subject to a number of limitations that impact the analysis and its robustness.

Despite a careful selection of case studies to reflect the variety of situations across the EU, the case studies do not provide a fully representative sample. This can be explained by the large territorial differences in terms of natural resources and the high variability of Member State implementation choices with regard to the CAP instruments and measures addressing natural resources,.

Processes involving natural resources are long-term phenomena whose trends cannot be observed on the short timescale of the CAP programming period, which has a limited availability of relevant data. Furthermore, a forensic assessment of the CAP's impact on biodiversity, soil and water is challenging when other factors are acting in parallel, including the increase in population and urban sprawl, economic development, pollution, invasive species and climate change.

The effects of other EU and/or national policies and the indirect effects of other CAP instruments and measures not designed and implemented to address the sustainable management of natural resources are not sufficiently taken into consideration, if at all. On a different level, the selection of crops and crop varieties are affected by demand and the variability of climatic conditions, factors not considered in this analysis.

Data is not always available to quantify the effects of CAP measures and instruments, due to discrepancies in the time period or the geographical scale to be considered. This seriously affects the ability to establish and identify the net impact results of CAP policies and to establish true counterfactuals accurately for any period of time studied.

Despite the extensive monitoring of the CAP and data collection from EU farms, the available databases have limitations for assessing the quantitative effects of the CAP on natural resources at farm or at local level.

Additionally, and given that all the evaluation studies on natural resources use to some extent the FADN database, several limitations arise from the use of this database.

[47] Including the UK, which was considered as a Member State for the purpose of the consultation. There were no contributions from Croatia, Malta and Lithuania.

These limitations may affect the possibility to run a complete statistical analysis and to monitor environmental impacts:

- The sample varies over time to avoid a bias towards more performing farms. This limits the possibility to follow changes in farm management over time.
- FADN data does not make it possible to distinguish beneficiaries of each rural development measure.
- FADN includes a limited number of environmental indicators.
- In accordance with FADN data protection rules and to ensure representativeness, samples with less than 15 farms have not been analysed, limiting the analysis of very targeted groups of farms. As a result of the above, in the analysis, some types of farms and agricultural practices are over-represented.

The aggregated output data under restoring, preserving and enhancing ecosystems (priority 4) for rural development makes it impossible to record detailed budget and operations by single farming practice. Therefore their environmental effects cannot be disentangled.

Little information was provided regarding the impact on soil productivity, given the unclear definition of 'soil productivity' that can relate to either soil fertility or yields. The concrete impact of CAP measures and instruments on soil fertility can be observed only in the long term.

While the implementation reports of the Water Framework Directive contain information from Member States on the modification of the waterbodies and the main pressures, this information is only available for large areas (corresponding to water basins), and therefore limits analysis of water use at lower (disaggregated) levels.

Over the period of the evaluation studies, the methodological approaches were reviewed and adapted if necessary to ensure an appropriate analysis of those data which were available. Additionally, where possible, information has been triangulated across multiple sources, and the partial nature of available information is acknowledged.

Nevertheless, by extending the analytical framework with complementary sources, the evaluation provides a comprehensive assessment of the impact of relevant CAP instruments and measures on addressing sustainable management of natural resources, providing useful case study examples on good practices and informed qualitative analysis, leading to useful conclusions and lessons learned (including the need for sufficient and timely indicators).

5. ANALYSIS

5.1. Effectiveness

The assessment of how effective the CAP instruments and measures were in addressing water, biodiversity and soil objectives is based on the evaluation support studies and replies to the public consultation. Updated data, analysis and findings from other sources as referenced complemented this information.

Implementation choices having a major impact on results

The CAP provides Member States with flexibility in fine-tuning cross-compliance and in the type of measures they adopt. They also have flexibility with the budget allocated to these measures under pillar II. In broad terms, the ***implementation choices*** that Member

States made suggest that the environment was not their top priority. Instead, their choices have primarily been driven by socio-economic, financial and administrative factors, which has limited the CAP's potential to address the sustainable management of natural resources. Member State choices were also driven by their experience of implementing the CAP in the 2007-2013 period.

As for the instruments and measures they chose to implement in order to address the sustainable management of natural resources, they needed a specific approach suited to local conditions. This was justifiable, given the diverse environmental conditions and challenges across Member States and regions.

On the basis of Member States selected for case studies in the study on biodiversity, it appears that at a strategic level, the priorities identified by Member States during their strategic planning documents for biodiversity (e.g. prioritised action frameworks and national biodiversity strategic action plans) are relatively well aligned and reflected in their rural development plans. However, when implementing the CAP, Member States chose instruments and measures that were not well aligned with these priorities. They failed to make use of the full range of CAP measures that would have been suited to meet these priorities. In particular, the analysis of the local implementation choices in the case study areas in the study on soil reveals that Member States and managing authorities made implementation choices that were unevenly aligned with soil threats at local level.

In Member States' decisions, soil quality was given less importance than other environmental concerns (i.e. biodiversity and water which benefit from binding EU objectives and dedicated legislation or services). This was **due to the absence of a specific soil directive or EU soil legislation**, and the lack of common EU definitions, targets and thresholds.

Involving water authorities in the design process of the RDPs, notably through the co-funding of rural development measures, played a significant role in the implementation of measures supporting practices beneficial to the sustainable management of water. The existence of EU legislation on water, including legally binding targets, may have contributed to this prioritisation.

For farmers, the choice whether to engage in biodiversity, water and/or soil quality-focused measures was mostly driven (when given the choice) by a combination of economic and financial factors and by a convenient (simple) policy design and degree of similarity with existing land management practices. All evaluation support studies showed that, to a lesser extent, environmental awareness and market developments also played a role, though minor, in the implementation choices that farmers made. Nevertheless, with farmers' increased awareness of environmental issues, the studies have shown farmers adopting more environmental practices and measures.

The lack of technical knowledge and advice (e.g. on alternative practices, relevant CAP support) appears as a key factor hindering the implementation of management practices addressing soil quality (but possibly common to biodiversity and water as well). As mentioned by the farm advisers surveyed in the case studies, the environmental and climate motivations were secondary reasons pushing farmers to implement the following RDP measures: investments (M4), organic farming (M11) and AECMs (M10).

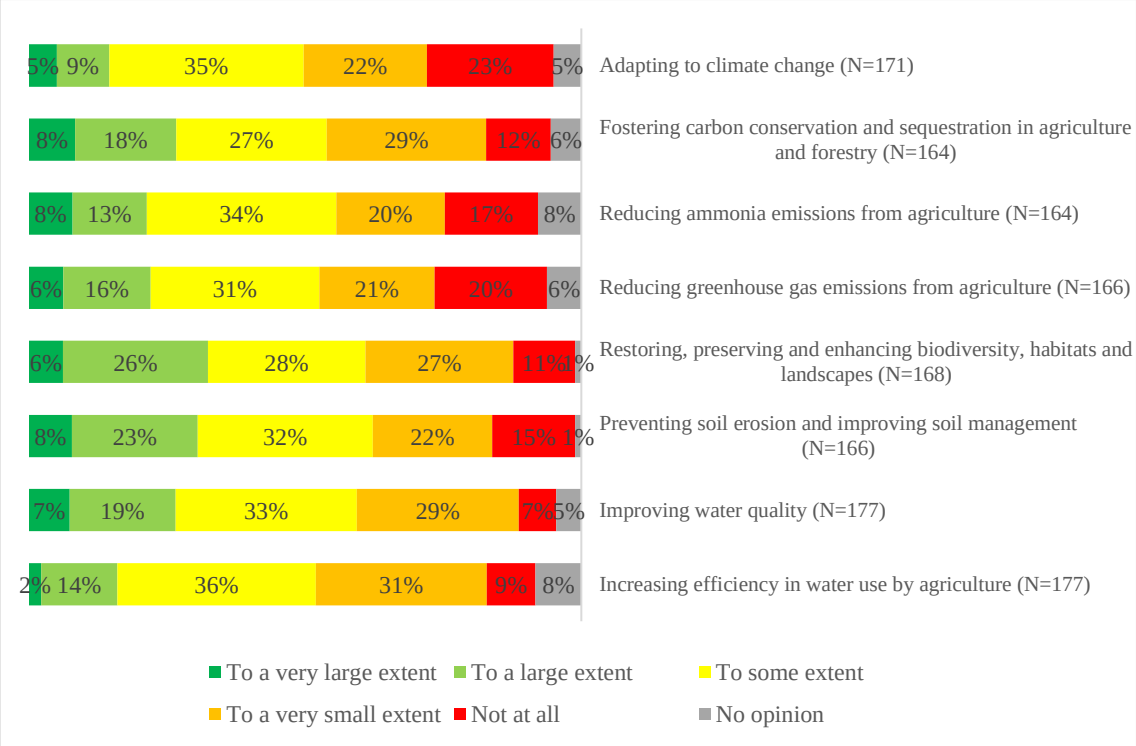
The interviews (from case studies in Germany, France and Austria) revealed that water-related measures are (financially) less attractive for intensive farming systems, which are generally located in regions facing water problems. It also means that CAP measures that

could help to address water problems are rarely implemented precisely in those areas where they are most needed.

The public consultation conducted for the evaluation enquired about the respondents' perception of the CAP's general contribution to the EU's environmental objectives. Replies did not yield a clear and general assessment. A majority of respondents (business associations and companies gave the highest rates of approval; public authorities were neutral; NGOs, researchers and EU citizens were negative) considered that the CAP helped to achieve the EU's environmental objectives 'to a very large extent', 'to a large extent' or 'to some extent'. However, the perception varies across the different objectives. Depending on the topic, 14% to 32% of the respondents believe that the CAP contributes 'to a very large extent' or 'to a large extent' to environmental objectives, whereas 36% to 45% believe that it contributes 'to a very small extent' or 'not at all'. Biodiversity and soil received the highest rate of positive replies (very large or large extent) and climate adaptation and GHG emissions reduction the highest rate of negative replies (not at all).

Environmental objectives and the CAP

Figure 4 CAP contribution to environmental objectives of the EU



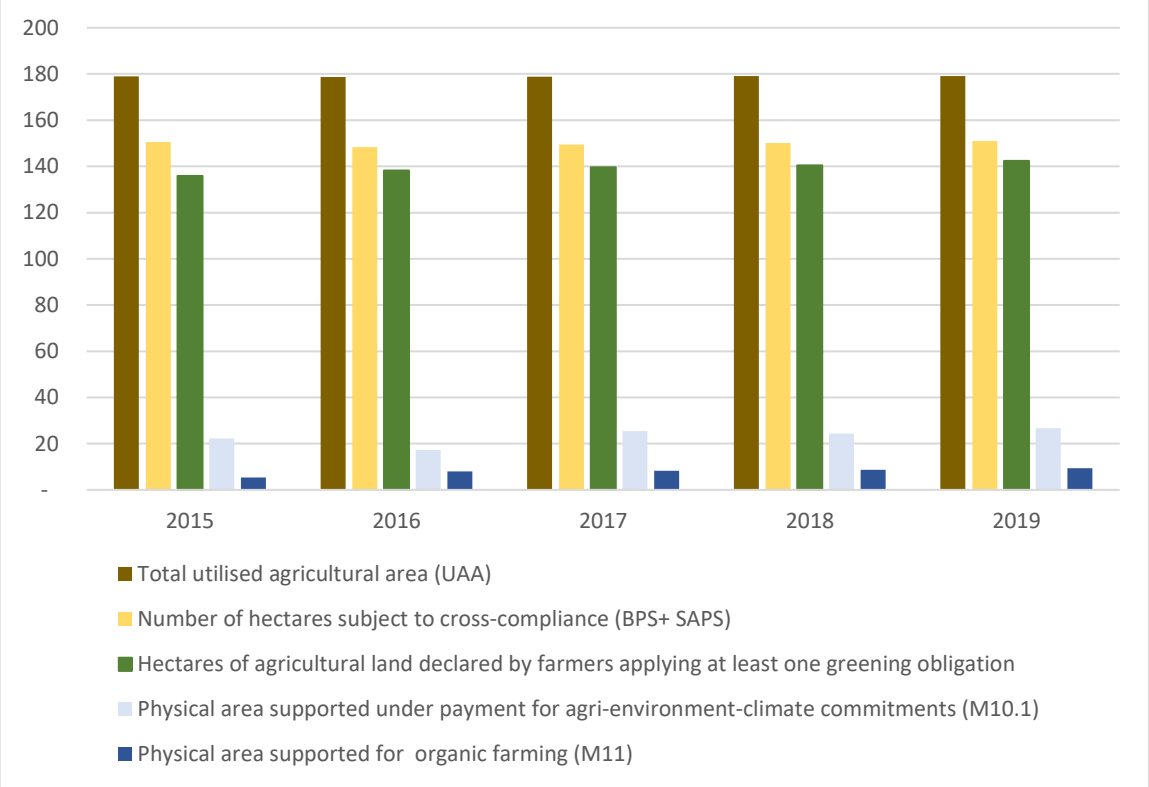
Source: public consultation[14]

5.1.1. Effectiveness of CAP instruments and measures contributing to the sustainable management of natural resources

The CAP aims to provide a basic and extensive 'baseline protection', with 84% of the total EU utilised agriculture area (UAA) subject to mandatory cross-compliance, with greening obligations providing additional environmental protection covering 80% of UAA, voluntary commitments under pillar II adding more targeted environmental provisions on 15% of UAA for AECM (M10) and 5% supporting organic farming (M11). The area subject to sustainable management commitments has increased over the evaluation period.

Agricultural land subject to cross-compliance concerned 151 million hectares in 2019[48]. Agricultural land declared by farmers applying at least one greening obligation amounted to 142.3 million hectares in 2019. The area supported under payment for agri-environment-climate commitments (M10) covered 26.7 million hectares in 2019, and the area supported under payment for organic farming (M11) increased to 9.4 million hectares in 2019[49] (while the total public expenditure under M11 doubled from EUR 938.8 million in 2015 to over EUR 2 billion in 2019[50]). The CAP support for conversion and maintenance of organic farming involved 14.3 million hectares in 2019 (+28% from 2015)[51].

Figure 5 Utilised agricultural area (UAA) and UAA under environmental provisions (million ha)



Source: CMEF indicators C.18 Agricultural area (CTX_SEC_18_1), OIH_01_1a, OID_05_3, OIR_06_1.1 and OIR_06_1.2.

5.1.1.1. Cross-compliance

Cross-compliance aims to ensure that beneficiaries of CAP implement mandatory basic standards and requirements by sanctioning non-compliance. As such, cross-compliance is considered to be an effective tool for influencing elementary land use and crop/livestock management practices beneficial for natural resources, e.g. through the creation and maintenance of buffer strips, the appropriate disposal of hazardous substances, the use of catch and cover crops, etc. In 2019, 84% of the EU-28 agricultural area was subject to cross-compliance.

[48] See footnote 36.

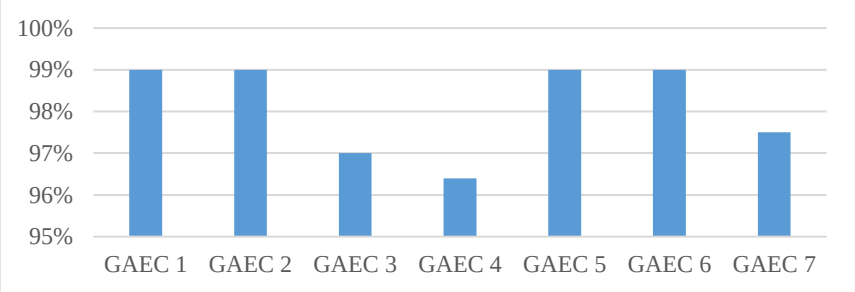
[49] See footnote 37.

[50] CMEF indicator OIR_01a_2.11.

[51] CMEF Indicator CTX_SEC_19_1b.

Data suggest that the compliance rate of farmers with GAECs varies only marginally with respect to the specific conditions. But it is estimated to be high, as only 1 to 4% of farmers have been found to be non-compliant. By maximising the number of farmers under horizontal measures, elementary practices that promote sustainable management practices and sustainable land use spread more, therefore setting a regulatory and environmental baseline in the EU.

Figure 6 Compliance of farmers with GAEC requirements (2015, average)



Source: Directorate-General for Agriculture and Rural Development based on the water evaluation support study

As for the actual effects of cross-compliance, the studies on biodiversity, soil and water point mainly to indirect effects, with some exceptions.

GAEC 1 – Establishment of buffer strips along watercourses

GAEC 1 on the implementation of buffer strips has the potential to effectively protect water from pollution but also to protect riparian margins. However, the way in which Member States implement this rule does not provide sufficient protection to waterbodies and does not always prevent pollution from nutrients, soil erosion and pesticides getting into watercourses, even if some Member States have enforced stricter rules. It only provides a sufficient degree of protection when both chemical and fertiliser application is forbidden (e.g. in Germany, Spain, France, the Netherlands, Poland, Finland), and buffer strips are covered by vegetation and are wide enough to prevent pollutants transfer into water. GAEC 1 can have positive effects by decreasing the risk of soil and bank erosion, and reducing leaching and runoff, which also affect the chemical status of water.

GAEC 2 – Compliance with authorisation procedures for abstraction of water for irrigation

GAEC 2 is less effective because only a few Member States actually verify whether the appropriate means are there to measure the volumes of water that farmers withdraw. Member States check whether farmers have obtained a water licence, and eight case study Member States from the water evaluation support study verify farmers' compliance with the authorisation order (Spain, France, Croatia, Italy, the Netherlands, Poland, Romania, Finland). This is the main instrument that promotes land uses and practices that are beneficial for reducing water abstraction through water abstraction control, and it was assessed as being effective in guaranteeing farmers' compliance with the authorisation order for water abstraction.

GAEC 3 – Protection of groundwater against pollution

GAEC 3 targets water pollution by prohibiting the direct or indirect discharge of some substances in water. In addition to this requirement, some Member States verify other aspects under this GAEC, such as the livestock manure storage distance from water (in the case studies from Finland, France and Germany under the water evaluation support study, where this measure was the most effective), the proper disposal of pollutants and

the absence of leakage storage tanks (in Germany). According to the case studies, this GAEC's implementation had a direct and positive effect on fostering land use and practices beneficial for reducing pollutants transferred by runoff and leakage, by reducing nutrients, organic wastes and chemicals applied on land. Improving the quality of water also indirectly affected the quality of the soil by halting its deterioration, though this effect is very difficult to measure.

GAEC 4 – Minimum soil cover

GAEC 4 directly affects the sustainable management of natural resources by promoting soil cover between the main crops in nitrate vulnerable zones but also by enforcing sufficient coverage on fallow land or after a ploughing or the removal of permanent crops, thus reducing soil erosion. It effectively contributes to the sustainable management of water in the context of crop and livestock management by influencing soil structure and helps to reduce soil and bank erosion and decrease the risks of runoff and leaching. And while this also has positive effects on the sustainable management of soil, the evaluation support study on soil at EU level found that in practice the effects on soil were limited, despite GAEC 4's potential. Some local positive effects limiting soil erosion and limiting the loss of soil organic matter linked to the use of soil cover were shown in some of the case studies from the study on soil, but with marginal effects, especially in erosion 'hotspots'. This GAEC can also encourage the planting of cover crops, though indirectly. This has led to improved management by farmers and increased productivity.

GAEC 5 – Land management to limit soil erosion

Limiting erosion is key for soil quality, and GAEC 5 can encourage practices and land use beneficial for soil sustainability. Sustainable management of the nutrient balance (through maintenance and the creation of landscape elements) and practices limiting soil compaction (reduced tillage and no-tillage, but marginal effect) were found to reduce soil erosion overall and therefore be positive. Although this GAEC's effect could not be quantified, the interviews in the case studies revealed positive effects reported locally (e.g. Greece has implemented standards within GAEC 5 by prohibiting surface irrigation on plots with >10% slopes).

GAEC 5 also affected water retention, though indirectly, as Member States can forbid ploughing in specific contexts (depending on the slope or climatic conditions) and sanction any activities likely to cause soil erosion (e.g. overgrazing in Finland). In practice, requirements under this GAEC are quite different in the case study Member States.

GAEC 6 – Maintenance of soil organic matter

GAEC 6 refers only to the absence of any burning of crop residues. On its effectiveness, even though the measure banned burning on all EU arable land, it induced no significant changes in soil management practices in the case study areas, except in Greece. It had marginal effects on promoting (i) less tillage and no tillage, (ii) the maintenance/incorporation of crop residues and organic matter and (iii) the application of organic amendments (compost, manure), which ultimately had positive effects on soil organic matter.

By promoting the maintenance of soil organic matter, this measure has indirect effects on water quality and quantity, because the conservation of soil coverage and organic matter reduces soil and bank erosion and decreases the risks of runoff and leaching. This

measure also seeks or can also be expected to provide benefits for soil fauna, such as earthworms.

The *evaluation on climate change and GHG emissions* found that compared to the 2007-2013 CAP, the number of Member States adopting additional requirements for the maintenance of soil organic matter decreased. However, part of these requirements (which include: restrictions on entering land when it is waterlogged or frozen; use of crop rotations; not growing successive crops with a high soil carbon demand; application and/or monitoring of organic matter; soil testing; and stubble management) are reflected in the 2014-2020 CAP, in the crop diversification obligation under greening.

GAEC 7 – Retention of landscape features

GAEC 7 addresses biodiversity through the retention of landscape features and includes (since 2013) a ban on cutting hedges and trees during the bird breeding and rearing season, and optional measures for avoiding invasive plant species. It requires the maintenance of certain landscape features that are expected to have a positive effect on both water quantity and quality. However, the level of requirement depends on the number of landscape features (hedges, ponds, trees in lines, etc.) protected and on the strictness of the measure (i.e. on the possibility to remove some features provided they receive special authorisation).

The case studies of the biodiversity study show that in a number of Member States, implementation choices reduced the measure's environmental benefits. The case studies point to a wide variation in uptake, with protection most commonly applied to groups of trees (7 Member States out of 10), hedges and isolated trees (6 Member States) and trees in a line and terraces (5 Member States); and the only requirement in the Netherlands was for farmers to obtain a permit before felling trees. According to the same evaluation, in theory, SMR 2 and SMR 3 should make the obligation to protect certain landscape features under the Birds and Habitats Directives more binding, although evidence that this is achieved in practice is lacking.

SMR 1 – Protection of waters against pollution caused by nitrates from agricultural sources

SMR 1 is linked to compliance with the Nitrates Directive (91/676/EC). It concerns areas in nitrate vulnerable zones and is aimed at ensuring appropriate application of (manure and mineral) fertilisers. The area concerned varies between Member States. The SMR has a positive effect on reducing inputs (nutrients, organic wastes and chemicals) applied on land, thus increasing water quality. It also resulted in catch crops, and to a lesser extent nitrogen-fixing crops, having to be planted in all nitrate vulnerable zones. No direct effect on soil and biodiversity has been proven.

SMRs 2 and 3 - Birds and Habitats Directives

SMRs 2 and 3 make the obligation to protect certain landscape features under the Birds and Habitats Directives more binding. There is evidence from the case studies that some Member States are not adequately and/or clearly incorporating the legal requirements of the relevant provisions of the Directives into their cross-compliance rules. More specifically, several Member States were not using cross-compliance to require action against priority invasive alien species; and from the case study countries, only three

(Hungary, Latvia and Ireland) have chosen to introduce cross-compliance to protect against invasive species, in accordance with the Invasive Alien Species Regulation[52].

SMR 10 – Plant protection products

SMR 10 is aimed at the protection of groundwater from contamination by plant-protection products. The only element verified in all the case study Member States is the use of market-authorised products. Besides this, many aspects (up to 17 in Austria) are checked with direct effects (e.g. appropriate means to avoid products drifting outside the treated area) or indirect effects (e.g. bee protection rules) on water protection. SMR 10 therefore seems to play only a minor role in reducing groundwater contamination[53].

5.1.1.2. Greening

The *evaluation on greening* demonstrated that the impact of greening measures on the environment and climate is highly dependent on Member States' and farmers implementation choices. Although the greening measures have made a small contribution to improving the environmental performance of farming, far more could be done to improve their performance. This could be done notably by changing the rules governing the operation of the measures and putting greater emphasis in Member States on using the greening measures in combination with cross-compliance and rural development measures[54].

Indeed, greening measures can potentially exert a positive impact on the sustainable management of natural resources due to their wide application (they covered over 78% of agricultural land in 2018) and their deterrence effect in case of non-compliance[55]. However, the studies on biodiversity, soil and water found limited evidence to this effect.

Ecological focus areas (EFAs)

In 2019, 69% of arable land in the EU was under an EFA obligation. Between 2015 and 2019, the number of hectares of actual EFAs declined from 10.5 million to 9.5 million (-9.4%). The composition of EFAs in arable land changed during that five-year period, with a 2.4 percentage point (pp) decrease in catch crops or green cover (to 2.1%) and reductions in nitrogen-fixing crops (-2 pp to 3%). However, land lying fallow remained unchanged (at 2.6%) and landscape features increased only marginally (+0.1 pp to 0.6%). Buffer strips, strips along forest edges and afforested areas also remained marginal.

The *evaluation on greening* found that EFA elements can potentially benefit not just biodiversity, their main objective, but also water, soils and climate. Member States were given considerable flexibility to choose the pool of EFA options available to farmers, and

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[52] Regulation (EU) No 1143/2014 of the European Parliament and of the Council of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species.

[53] There is significant potential for further risk reduction through more complete implementation of the Sustainable Use of Pesticides Directive (2009/128/EC) and, in particular, greater adoption of integrated pest management (IPM), including the more widespread adoption of non-chemical pest control techniques. However, the implementation of IPM has not been assessed under cross-compliance to date, and it will not be part of inspections under conditionality under the new CAP.

[54] As observed in the European Court of Auditors Special report 21/2017 on greening.

[55] If a farmer is found non-compliant with crop diversification requirements, the surface eligible for greening measures can be reduced by up to 50%. The same kind of sanction applies to ESPG and EFA measures. If the sum of a farmer's non-compliance with greening measures leads to a more than 20% reduction of their eligible area, no greening payment is received. If this value reaches 50%, extra financial sanctions might be applied.

whether and how to lay down rules for their structure and management. The European Commission concluded in its 2017 report on the implementation of EFA[56] that despite the considerable flexibility, Member States do not use this discretion to maximise the policy's environmental and climate benefits, but rather strive to implement greening in a way which minimises the burden on themselves and farmers. In particular, the predominance of productive EFAs, together with insufficient management requirements, reduces the potential benefits of greening for biodiversity. The same conclusion was made by the European Court of Auditors in its Special Report 21/2017. As a follow up, the Commission introduced in 2018 provisions to enhance the environmental delivery of greening, including a ban of pesticides and fertiliser on EFA[57].

Three of the most widely declared EFA elements in 2019 were: catch and cover crops (accounting for 55%), nitrogen-fixing crops (23%) and fallow area (18%). The percentage of EFAs covered by nitrogen-fixing crops decreased from 2017, possibly due to the ban on pesticides for these areas introduced in 2018.

The evaluation on greening shows that for the EU-28, the EFA element that potentially can have the greatest net positive environmental and climate impact is land lying fallow, with landscape features (i.e. hedges, trees, ponds and ditches), field margins, buffer strips and multiannual nitrogen-fixing forage crops also having the potential of yielding net benefits. However, few benefits are expected from certain EFA elements because of the lack of appropriate management requirements (e.g. to prevent pesticide use or nitrogen-leaching by use of nitrogen-fixing crops) and the low level of uptake (e.g. the non-productive options). Nonetheless, some Member States have put in place requirements to bolster the environmental performance of EFAs (e.g. rules on the post-harvest management of nitrogen-fixing crops in Spain and Germany, and the EFA equivalence scheme under AECMs in Austria).

In addition, where the EFA measure has helped slow the decline of multiannual forage legumes, this is expected to be beneficial, e.g. in Spain, where traditionally cultivated legumes provide suitable habitats for a wide range of species, including wild bees and other pollinators, and some mammals and birds that are threatened in the EU (even if this example is not representative for the EU). On the other hand, there are some examples where the EFA measure may be reinforcing the use of certain types of management that result in net negative impacts on biodiversity in certain situations (e.g. the replacement of overwinter stubble with cover crop mixes over winter).

The evaluation on greening also found that the EFA requirement's net impact on biodiversity could be much greater if farmers were to coordinate types and spatial arrangements to form larger habitat patches (as larger areas tend to be more resilient, hold more viable populations and have greater species richness) and/or mosaics of complementary habitats. This might also be beneficial from a soil and water management perspective, depending on the location of the EFA elements.

The *support study on biodiversity* considers that despite the low level of fallow land in arable land, there is some indication that the measure may have had a beneficial effect,

[56] Report from the Commission to the European Parliament and the Council on the implementation of the ecological focus area obligation under the green direct payment scheme, COM/2017/0152 final, https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=COM%3A2017%3A152%3AFIN.

[57] Commission Delegated Regulation (EU) 2017/1155 of 15 February 2017.

due to the stabilisation/reversal of area in 18 Member States, following a negative trend in EU fallow area over 2007-2014 (resulting in a 31% loss). Some of the largest increases in fallow land occurred in Spain. It was one of five Member States where fallow land comprised more than 50% of the EFA area, and where declines in threatened bird species had been linked to previous declines in fallow land.

In addition, the EFA measure has helped to slow the decline of multiannual fodder crops in some Member States, such as Spain where the reappearance of traditionally cultivated legumes has been reported (e.g. alfalfa, vetches, peas and beans). This provides foraging habitat for a wide variety of species, including wild bees and other pollinators, and some threatened mammals in the EU.

However, the potential benefits of the EFA measure are not fully realised, as the most commonly declared EFA elements (i.e. catch crops and nitrogen-fixing crops) have low biodiversity benefits for most farmland species, other than soil fauna, even if they can reduce water pollution, which benefits aquatic ecosystems and biodiversity. Nevertheless, the ban on using pesticides on these productive areas that has been in place since 2018 has significantly improved the benefit of EFAs for biodiversity.

The *study on soil* found that although EFAs had very little impact on the establishment and maintenance of landscape features, the ban on using plant protection products (SMR 10) on EFAs had a positive effect on soil management practices and the reduction of soil pollution. In interviews with local authorities and farmers representatives in the case study areas, the majority considered that the EFA measure did not result in significant changes in farm management practices or in the choice of soil cover. Nevertheless, technical advisers underlined that the EFA measure helps to establish relevant cover crops and raise farmers' awareness of the positive effect of intercrops and has also started to improve the mix of species used in the cover.

According to the *study on water*, most of the EFA elements can influence land use to improve water quality (i.e. landscape features, fallow land, nitrogen-fixing crops, short-rotation coppices and forest areas) and also positively impact water quantity (aside from nitrogen-fixing crops and short-rotation coppice). According to the interviewees in the case studies, the effects of EFAs on water quality are rather positive in all case study Member States and highly positive in Aragon (Spain), Croatia and Apulia (Italy).

Crop diversification

In 2016, 23.5% of farms produced at least 3 crops (-1.0 pp from 2013), with 10.3% of farms producing 3 crops (-0.6 pp) and 13.2% more than 3 crops (-0.4 pp). The number of hectares of arable land declared by farmers subject to crop diversification was 77.7 million hectares in 2019, which corresponds to 74% of arable land in 2019. About 12% of arable land was exempted from the diversification measures (e.g. organic farms, fallow land or grassland).

The *evaluation on greening* established that by increasing the number of crops that are cultivated, crop diversification not only improves soil quality but may also have some effects on biodiversity (particularly soil biodiversity), water and climate. These effects depend on the types of crops grown and when they are grown (e.g. spring-sown versus autumn-sown), with greater environmental and climate benefits achieved where multi-year crop rotations are put in place. In terms of net effects, the measure probably benefits biodiversity in the most intensive arable landscapes, especially those dominated by maize or winter wheat. But overall the impact is minor due to the low percentage of additional

land diversified. The assessment of this effect, however, does not take into account the effect of slowing the trend towards greater monoculture. There is some indication that a shift from winter to spring crops has been partly encouraged – to some extent - by this measure and this would be beneficial for biodiversity, particularly if stubble is left in the ground over winter. Protection of soil from erosion may have improved in countries such as France, Germany and the Netherlands where maize has frequently been replaced by crops providing better soil cover, e.g. wheat, barley and other cereals, or by legumes. Although this may not always be the case if shorter growing seasons for legumes such as peas leave the soil without cover for long or where maize has been replaced with another row crop such as sunflowers, as in France. The greatest environmental impact is likely to have been in Spain, since it accounts for the largest area of land on which changes in cropping have taken place. Since the main changes were the replacement of cereal crops by legumes, benefits for soil and water quality and GHG emissions are likely to have occurred (the latter two as a result of reduced applications of nitrogen fertiliser).

The case studies under the *study on biodiversity* did not produce evidence of any considerable impacts of the crop diversification requirement, which resulted in different crops being cultivated on just 0.8% of the arable area in the 10 case study Member States. However, the *evaluation on climate change and GHG emissions* found that while crop diversification required changes of crop on less than 1% of EU arable land, it encouraged farmers to maintain diversification and notably had impact in areas with high levels of mono-cropping. According to the evaluation support study on greening, most farmers who had to diversify mainly planted leguminous plants instead of cereals, and they mainly did it in rotation; both practices were identified as being positive for adaptation by favouring resilience to pests and droughts and improving soil structure.

The *study on soil* found that crop diversification with the cultivation of nitrogen-fixing crops had positive, albeit indirect, effects on the soil organic matter (and increased soil productivity as well). The *study on water* also found indirect benefits for water protection (reducing the need for pesticides, increasing organic matter, etc.). But it also established that while catch and cover crops have many positive effects on water-related pressure, they are already promoted by other instruments (e.g. SMR 1), which therefore limits the additional effect of crop diversification. On the other hand, among the case study Member States that decided to introduce crop-diversification equivalence schemes, two (Poland and Austria) decided to implement more demanding crop diversification measures through AECMs, which led to improved effects.

Permanent grassland

In 2019, EU-28 total utilised agricultural area (UAA) stood at 179.4 million hectares (an increase of over 1 million from 2012) of which 34.3% was permanent grassland and meadow (+1.1 percentage points)[58].

The *evaluation on greening* states that the environmental and climate benefits of maintaining the area of permanent grassland by limiting declines in the ratio of permanent grassland to total agricultural area to less than 5% depend on the location and type of grassland maintained and the extent to which the grassland that remains in place is ploughed or reseeded. The changes in the definition and eligibility of permanent grassland that were made in the 2013 CAP led to changes in the eligible area of

[58] CMEF indicators C.18 Agricultural area (CTX_SEC_18_1 and CTX_SEC_18_2b).

permanent grassland under protection and the calculation of the ratio. Where prior authorisation processes are in place, greater environmental and climate benefits are likely to accrue since these provide the opportunity to assess the environmental and climate impacts of proposed grassland removals and proceed accordingly.

The permanent grassland ratio requirement aimed at halting the loss of grassland. However, as of 2019, the comparison ratio registered negative values in 9 Member States and 10 regions of the four Member States that made regional calculations, but none exceeded the 5% threshold. In most cases, though, the changes in national/regional annual ratios under greening and in the 'comparison ratio' resulted from a reallocation of permanent grassland areas within the terms of the ratio rather than their actual decrease. Instead, the figures reflected the combined effects of a substantial increase of/conversion to organic permanent grassland and, to a lesser extent, of decreasing permanent grassland under the small farmers scheme. It was also affected by changes to agricultural areas.

While 7 Member States deemed such situations sufficient to adapt the reference ratio, others did not do so, resulting in lower or negative figures for the 'comparison ratio'. Between 2015 and 2019, permanent grassland increased in 17 Member States, with a relative +/- 1% stabilisation in 8 Member States and a decrease of more than 1% in 2 Member States (Estonia and the UK). The mechanism of reconversion was activated four times in 2 Member States (Cyprus, in 2015 and 2016, and Estonia, in 2016 and 2018) to reverse the more than 5% drop in the annual ratio.

The case studies under the *studies on biodiversity, soil and water* found that the permanent grassland measure had positive effects on water quantity and quality. However, these case studies also acknowledged that management practices can be detrimental to water quality (e.g. ploughing of grasslands increases the risk of erosion and runoff and reduces their organic matter content). On its effects on soil, the ban on ploughing was paramount for acting on not only carbon storage but also reducing soil erosion.

Biodiversity benefits were difficult to measure accurately due to the definition of permanent grassland, along with the ratios being calculated mostly at national level (maintaining the ratio alone provides limited biodiversity benefits as it can mask significant losses in some areas). In countries where this ratio has been calculated at regional level, it has limited overall permanent grassland losses to some degree. Besides the positive effect of protecting permanent grassland, Natura 2000 zones include areas of high value to nature, but also areas with carbon-rich soil and wetlands, which are two important aspects for water protection, retention and soil erosion.

Environmentally sensitive permanent grassland (ESPG)

The *evaluation on greening* considers that by protecting large areas of permanent grassland within the Natura 2000 network from being ploughed up, the ESPG measure has the potential to result in substantial and wide environmental benefits, given the importance of these areas for biodiversity, soils, water and climate objectives. This measure therefore has the potential to complement the protection under the Birds and Habitats Directives. However, the potential benefits of the ESPG measure are limited by the low area of sensitive grasslands[59] designated in many countries.

[59] Permanent grassland in areas covered by Directives 92/43/EEC or 2009/147/EC can include Habitats Directive Annex I grassland habitats designated as a site of Community interest, Habitats Directive

The evidence of how Member States have designated ESPG suggests that there are different interpretations of what constitutes 'the environmentally most sensitive areas' which 'need strict protection' under the Direct Payments Regulation. The low levels of ESPG designation in some Member States suggest that there is scope to extend its coverage and increase its impact, particularly in light of the important challenge of achieving good conservation status of these valuable grasslands to which the ESPG measure should contribute.

There is also the potential for wide environmental benefits from the designation of ESPG beyond Natura 2000 sites. However, such impacts are currently very limited because the option to designate ESPG outside Natura 2000 sites was only taken up by 5 Member States (Belgium, Czechia, Italy, Latvia and Wales(UK)), of which only Czechia designated a significant amount. The combined area was only equivalent to about 2 % of the total EU area of Annex I habitats outside the network, and much of the area is already protected to some extent under national legislation through the provisions of the Nature Directives (in particular Article 6 of the Habitats Directive).

Evidence from the case studies carried out under the evaluation on greening indicates that ESPG designation is nonetheless adding some value within and outside Natura 2000 sites as a means of complementing the implementation and enforcement of the Directives in Member States and helping to reduce the continuing pressure from agriculture.

From the *studies on biodiversity, soil and water* it can be derived that the ESPG measure is most effective in Member States that have a high rate of ESPG on total permanent grassland (Italy, Romania), coupled with the stringent controls associated with the CAP and advice through farm advisory services on areas subject to the ESPG requirements.

5.1.1.3. Area-based rural development measures

Agri-environment-climate measure –AECM (M10)

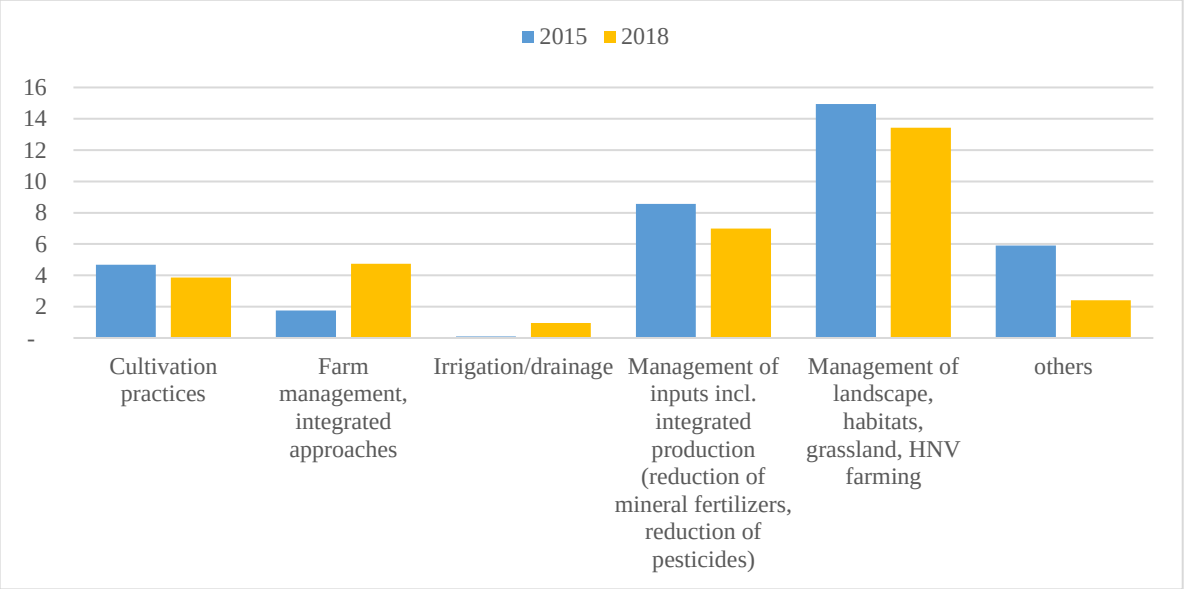
In 2018, 14% of EU utilised agricultural area received AECM support. Over 2015-2018, 12-15 million hectares were concerned by AECM support for maintenance of high nature value arable and grassland systems, the introduction of extensive grazing practices, the conversion of arable land to grassland and the creation and upkeep of ecological features (e.g. field margins, buffer areas, flower strips, hedgerows, trees).

Management of fertilisers and pesticides affected approximately 6-9 million hectares and cultivation practices (soil cover, ploughing, etc.) between 3-5 million hectares. Areas supported for farm management practices (manure management, crop rotation, etc.) have grown steadily from 2 to 5 million hectares between 2015 and 2018.

There was common agreement by interviewees in case studies of the various *evaluation support studies* that AECM promote practices beneficial for natural resources. AECM target all three focus areas of priority 4 – biodiversity, water and soil, depending on the needs identified in the individual RDPs.

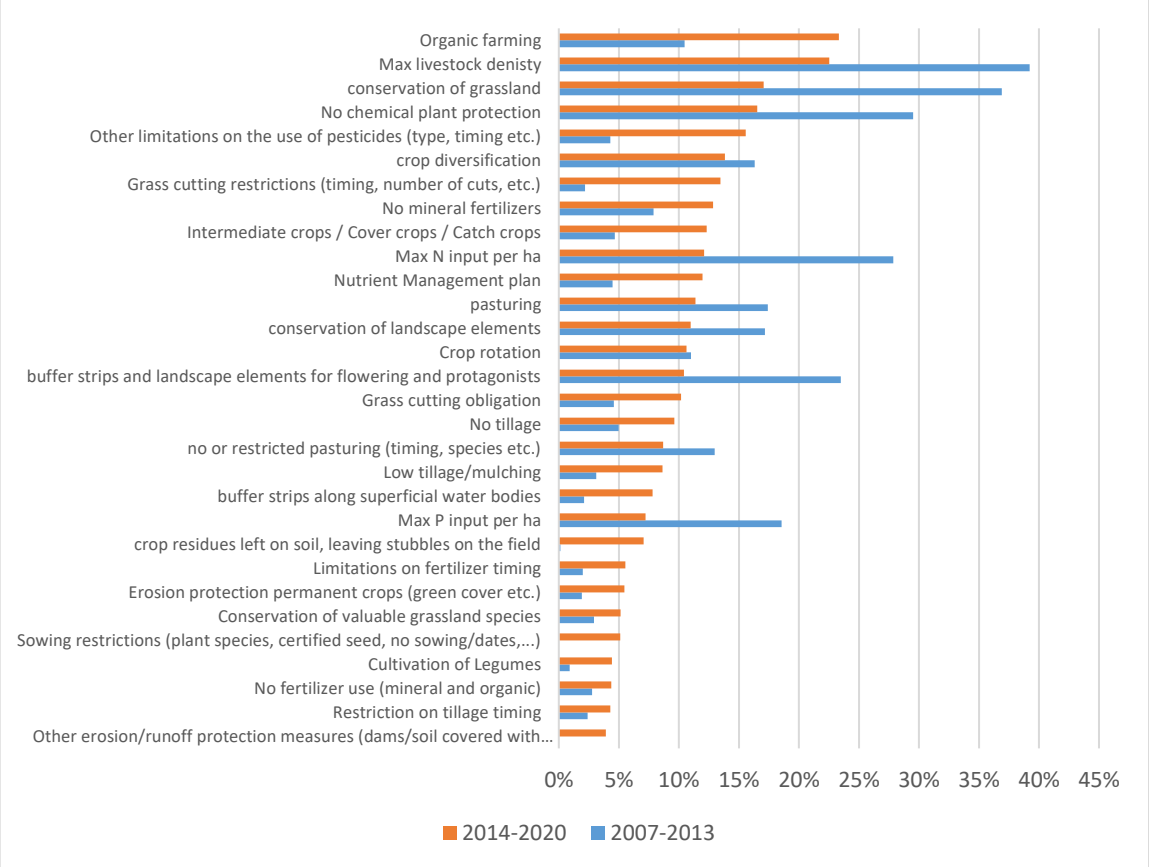
Annex II habitats of species which depend on grassland management designated as a site of Community interest and Birds Directive Annex I habitats of birds which depends on grassland management designated as a special protected area.

Figure 7 Evolution of areas funded under AECM sub-measure 10.1 (million hectares)



Source: Directorate-General for Agriculture and Rural Development

Figure 8 Share of standardised farm practices supported by M10 and M11 in the RDPs in terms of hectares implemented for the reporting periods 2007-2013, 2014-2020



Source: Joint Research Centre compilation

Figure 8 presents the **top 30 farm practices supported by AECMs and organic farming** in the RDPs in terms of area share for the 2014-2020 period (and 2007-2013 for comparison). In 2014-2020, the main farm practices beneficial to natural resources supported by AECM relate to limiting livestock density (and pasturing), the conservation of grassland, no or reduced use of pesticides, crop diversification and crop rotation, grass

cutting restrictions, nutrient management, cover crops and the conservation of landscape features. The biggest change in the two periods relates to the reduced share of areas supported under grassland conservation (-20 pp), maximum livestock density (-17% pp), maximum mineral fertilizer and nitrogen input (-16 pp each), as well as increased areas supported under organic farming (+13 pp), grass cutting restrictions and restrictions on pesticide use (+11 pp each).

Extensive livestock farming, buffer strips, catch and cover crops and crop residual management are beneficial to water quality and quantitative management. However, nutrient management plans are beneficial for water quality only. Crop diversification and crop rotation are beneficial to soil management. AECM are also used to target support for wild pollinators' habitats, to maintain existing semi-natural habitats and landscape features and to create new habitats.

Organic farming (M11)

The EU organic area significantly increased between 2015 and 2019, with a more than 75% increase in the area supported under organic farming, and reached a share of 5% of UAA in 2019. There is considerable variation across Member States in the area of farmland planned for conversion to or maintenance under organic farming, from less than 1% in three Member States (Bulgaria, Malta, Romania) to more than 10% in eight (Czechia, Denmark, Estonia, Italy, Cyprus, Finland, Sweden), and over 25% in Austria.

Interviewees in case study Member States under the *various support studies* agreed that support to organic farming contributed significantly to the development of organic farming and therefore to a change in management practices. This support had a positive impact on the quality of water both directly (e.g. no synthetic pesticides used) and to some extent indirectly and was also beneficial to quantitative management (e.g. crop diversification, increased soil coverage, etc.). Organic farming contributes to the development of biological pest control and precision farming, thereby reducing the use of fertilisers and pesticides (Germany, Spain, France, Croatia, Italy, Austria, Romania, Finland), and also contributes to the conservation or soil incorporation of crop residuals (Croatia, Italy, Austria, Poland, Romania, Finland). The measure also provides measurable benefits for biodiversity, particularly in more intensively farmed landscapes and especially in relation to relatively common and generalist species.

Overall, the studies find that the measure has positive impacts on water and soil quality by promoting the reduction of inputs (fertilisers, pesticides) applied on lands compared to conventional farming and by promoting practices to preserve soil structure and organic matter in soil. This in turn has a positive impact on reducing erosion, runoff and leaching (through sustainable management)[60].

Natura 2000 and Water Framework Directive payments (M12)

A limited number of Member States assessed in the case studies of the evaluation support studies (Germany, Spain, Italy, Austria) used this measure, and it was only in Germany that this measure had a significant positive effect on practices relevant to water protection. Complementary evidence is found in the synthesis of the evaluation of the enhanced AIR, according to which the measure significantly contributes to carbon conservation and sequestration in some Member States. The benefits to biodiversity arise

[60] For an elaborate description of the impacts of organic farming, see https://www.thuenen.de/media/publikationen/thuenen-report/Thuenen_Report_65.pdf.

as an indirect result of the rules and management plans being more environmentally ambitious than they otherwise would have been without the measure. In any case, despite its potential, the measure's actual effects are limited because of its low level of implementation. However, areas supported under Natura 2000 and Water Framework Directive payments (M12) increased from 1.1 million hectares in 2015 to 1.6 million hectares (+55%) in 2019. Overall, Natura 2000 areas (including natural grassland) accounted for 1% of UAA in 2018 (stable compared to 2011).

Payments to areas facing natural or other specific constraints – ANCs (M13)

Some 96.6% of expenditures, corresponding to 78.9% of the beneficiaries supported through this measure, were nominally allocated to restoring, preserving and enhancing ecosystems (priority 4) over the 2015-2018 period. However, the benefits for the sustainable management of natural resources are difficult to establish, as the measure is generally not directly associated with specific management requirements.

The European Court of Auditors considered that the majority of payments for ANCs are not linked to environmental objectives and are no more beneficial to farmland biodiversity than the basic payment scheme[61]. However, if land abandonment (one of the main threats to biodiversity and leading to its loss) can be avoided, the specific local biodiversity can be preserved. ANC payments can clearly help to avoid land abandonment and therefore contribute to biodiversity objectives.

As recognised in the study on the future of EU livestock, mountain grasslands are often characterised by greater plant and animal biodiversity than the wooded and shrubby formations of these same landscapes, and grazing keeps shrub cover under control. The study found that livestock, especially ruminants, can have a positive impact on biodiversity and soil carbon because they enable the maintenance of permanent grassland and hedges and an optimised use of manure[62]. As such, ANC payments have a clear impact on biodiversity, because they maintain livestock in mountain areas.

Investments in physical assets (M4)

The *study on water* found that the measure helped to implement sustainable practices on water by promoting new management practices (e.g. minimal soil cultivation, soil incorporation of crop residuals) or by promoting investment in irrigation and water collection infrastructure. The result was that farmers were able to invest in specific equipment to limit water pollution but also to better manage the quantity of water[63].

The study found that the measure positively affected the use of water in crop and livestock management practices. But it also had indirect negative effects on water quality, given that the support for artificial drainage (in the Netherlands and Poland) contributed to pesticides and nitrates being directly carried into surface water. The

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61 European Court of Auditors Review 01 – Tracking climate spending https://www.eca.europa.eu/Lists/ECADocuments/RW20_01/RW_Tracking_climate_spending_EN.pdf European Court of Auditors Special report 13 – Biodiversity on farmland. https://www.eca.europa.eu/Lists/ECADocuments/SR20_13/SR_Biodiversity_on_farmland_EN.pdf.

62 Dr Jean-Louis Peyraud and Dr Michael MacLeod, 'Study on Future of EU livestock: how to contribute to a sustainable agricultural sector?', 2020.

63 However, there are mixed perceptions; environmental experts claim that insufficient compliance controls and monitoring hinder the measure's effectiveness. Whatever the case, as water basin authorities are responsible for irrigation authorisations and for monitoring water use, these possible drawbacks are not due to the CAP itself.

measure can also have drawbacks in the form of investments that increase water use (e.g. investments in bigger irrigation systems lead to increased water abstraction). Consequently, the measure's impact on other natural resources is also minimal but positive because of the indirect effect that reducing soil desalinisation has on improving water quality.

Investments in forest area development (M8) and forest-environment and climate services and forest conservation (M15)

Despite the potential of forest and agro-forestry having considerable positive effects on the sustainable management of natural resources, including the prevention of soil erosion and allowing water retention in the soil, these measures were less effective because of a low uptake and a limited focus on measures addressing biodiversity objectives (mostly targeting the protection and enhancement of social and environmental ecosystem services in forests). Only 2 of the 10 case studies in the study on soil demonstrated forest management practices sustainable for soil (e.g. in Czechia, support for introducing supplementary species in forests with important anti-erosion functions). At EU level, investments in forest area (M8) reach 2.5% of the UAA and forest services (M15) 0.3%. Therefore, the measures had little impact on soil management.

5.1.1.4. Knowledge, cooperation and innovation

Knowledge transfer and information actions (M1)and advisory farm management and relief services (M2)

The case studies in the *study on water* revealed that increasing farmers' awareness and promoting knowledge transfer and information actions are important aspects to achieve water quality and quantity objectives. All case study Member States programmed knowledge transfer and information actions, although less than 25% of the supported actions and training days targeted the relevant priority (4) and focus areas (5D and 5E), and only 1.1% targeted focus area 5A on water quantity. However, stakeholders from the case studies mentioned that even when training does not focus on water savings or on water quality, these subjects are often addressed directly (e.g. during training on economic performance to limit input use) or indirectly (e.g. during training on conservation tillage, since these practices can affect soil organic carbon content with effects on both water quantity and quantity). The *study on soil* found that the measure had strong effects on promoting soil sustainable practices in those Member States where sustainable soil management activities were implemented.

Support for advisory services benefited 5.5% of EU farmers. As advisory services have adopted a broader focus on biodiversity, like support for AECM schemes, they have helped increase uptake and effectiveness to improve the status of all natural resources. The study on water pointed to positive effects on water when farmers were advised to use machinery limiting soil compaction, to engage in precision farming and manage fertilisers and pesticides with more efficient equipment, to apply a nutrient management plan and to maintain or create buffer strips (in Finland). In other Member States, effects on water have been limited due to delays in the measure's implementation (Spain, Italy, Romania), or its administrative complexity (France, Germany). The study on soil revealed that the measure's effects on soil were limited at the EU level, and depended on the number of Member States undertaking projects with soil management as a main objective. Where implemented, the measure was considered effective in helping to address various soil threats (e.g. erosion, compaction, soil organic content).

The case studies in the *study on biodiversity* support the findings mentioned above on both measures and confirm that these measures help the relevant measures (cross-compliance, AECM, organic farming) have greater impact. But they also confirm the various limitations linked to implementation.

FAS – Farm advisory system

According to the *study on water*, the FAS effectively contributed to the sustainable management of water in half of the case study Member States (Spain-Aragon, Croatia, the Netherlands, Austria and Poland). In those Member States (except Poland), the FAS focused on natural resources issues, with potential positive effects on the chemical status of water, and especially on water quantity status. The FAS also made farmers more aware of their obligations under the Birds and Habitats Directives. Advice to farmers is crucial, especially when farmers need to significantly change their practices (e.g. to adapt to new water-related regulations, to climate change or to changes in societal demand).

Cooperation (M16)and Support for LEADER local development (M19)

The case studies under the evaluation support studies found only a few examples regarding the implementation of the cooperation measure. These examples concerned projects targeting water objectives in Croatia, the Netherlands and Spain (innovation in irrigation, preventing floods and ensuring better water quality). In some of the other case study Member States, projects targeting other objectives were found to have indirect effects on the management of water quality and quantities, but there was no data to quantify their impact on water. Overall, while all Member States used this measure, less than 11% of the actions targeted the relevant priority (4) on restoring, preserving and enhancing ecosystems and focus areas (5D on reducing nitrous oxide and methane emissions from agriculture, and 5E fostering carbon conservation and sequestration in agriculture and forestry) and 1% targeted focus area 5A (increasing efficiency in water use by agriculture). Cooperation benefited 0.1% of EU farmers.

The situation is similar with LEADER (M19), which was used in three of the case study Member States to promote water management projects (Austria, Romania, Finland).

5.1.1.5. Other

Because direct payments support farm income, they can help to prevent land abandonment and hence keep farmers active, especially those whose farms are less profitable. As presented in the findings of a report on 'the challenge of land abandonment after 2020 and options for mitigating measures', the harmful effects of land abandonment could threaten the future of semi-natural habitats. Under specific conditions and in certain phases of the abandonment process, though, beneficial outcomes might be observed for biodiversity and habitats[64]. The same study acknowledges the impact that the support for farm income and competitiveness has in mitigating land abandonment, while highlighting the detrimental effect of not targeting such support and not specifying the level of environmental ambition.

By making support under the ***basic payment scheme/single area payment scheme*** conditional on cross-compliance, direct payments contribute indirectly to natural

[64] ÖIR GmbH, BAB, RegioGro, 'Research for AGRI Committee - The challenge of land abandonment after 2020 and options for mitigating measures', 2020 https://www.europarl.europa.eu/thinktank/en/document.html?reference=IPOL_STU(2020)652238.

resource objectives addressed through SMRs and GAECs, as described in the corresponding section on cross-compliance. In addition, the absence of basic payments could lead to the abandonment of small diversified holdings, mostly in grass-fed animal sectors and in ANC areas, or to the conversion of these farms to arable crops, which would have negative effects on water and soil (e.g. reduction of permanent grassland). This is substantiated in the Scenar 2030 report on 'Pathways for the European agriculture and food sector beyond 2020', which assessed the implication of a counterfactual 'no CAP' scenario on land use and the environment (among other aspects), showing that without the CAP, land abandonment, including grassland would be higher (with a reduction of 6.9% in UAA and 8.8% in grassland area)[65].

It is very possible that without CAP payments and the attached compulsory conditionality, environmental considerations would be neglected to the benefit of economic objectives. For example, the presence of high densities of trees or other ineligible vegetation could result in an incentive to remove trees and other vegetation that would otherwise disqualify a beneficiary from claiming payments, leading to habitat damage and in some cases loss (especially habitats under the Habitats Directive). Although the study on biodiversity did not find any recent evidence for such situations, it found examples of such incentives during the 2007-2013 CAP period, when substantial areas of semi-natural habitats (much of which are high diversity habitats) were deemed ineligible for direct payments because of the presence of scrub, shrubs and trees. The case studies under the study highlight that the land eligibility criteria for direct payments could prevent the encroachment of semi-natural vegetation on agricultural land, which can discourage the establishment of landscape features, or encourage farmers to remove landscape features (Belgium-Wallonia, Spain-Aragon). These effects can be avoided if areas are eligible for direct payment and hence subject to cross-compliance.

On the downside, basic payments for the sustainable management of natural resources can be negatively perceived, as they are granted to all farms, irrespective of their degree of input use. Nonetheless, by decoupling support from production and linking support to the respect of standard environmental and climate practices, basic payments do not act as an incentive to produce more intensively. Between 2013 and 2017, the UAA managed by farms with high input intensity[66] per hectare remained stable (36.3%), while the share of land managed with medium input intensity (36.5%) increased (+3.9 pp), at the expense of the land managed by farms with low input intensity (27.2%). In 2016, 21.7% of the UAA in the EU-28 was devoted to extensive grazing, which is 7.7 pp below the 2013 level[67].

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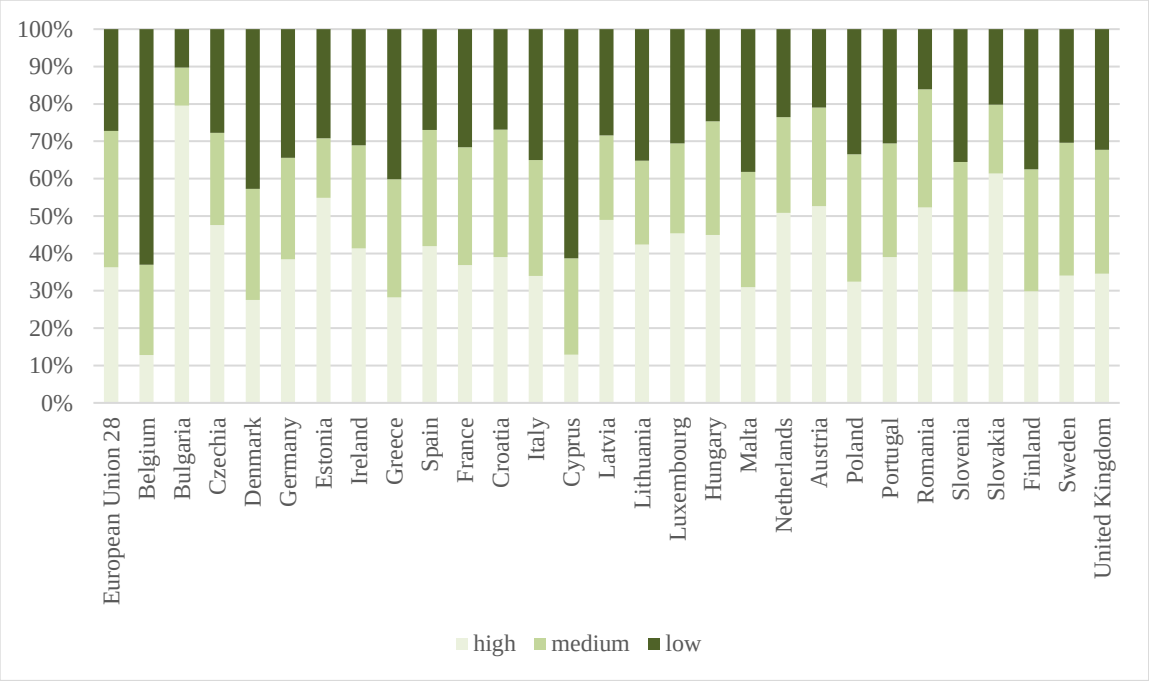
65 R. M'barek, J. Barreiro-Hurle, P. Boulanger, A. Caivano, P. Ciaian, H. Dudu, M. Espinosa, T. Fellmann, E. Ferrari, S. Gomez y Paloma, C. Gorrin Gonzalez, M. Himics, K. Louhichi, A. Perni, G. Philippidis, G. Salputra, P. Witzke, G. Genovese; Scenar 2030 - Pathways for the European agriculture and food sector beyond 2020 (Summary report), EUR 28883 EN, Publications Office of the European Union, Luxembourg, 2017
Scenar 2030 - Publications Office of the EU (europa.eu).

66 Farm input intensity is used as a 'proxy' of agricultural intensification, meaning an increase in agricultural input use (fertilisers, pesticides and feedstuff) per hectare of land. Farms are classified into intensity categories according to an estimate of input volume per hectare of UAA. Then, each farm is classified according to its average level of input use per ha (high intensity if > 300 constant EUR/ha, low intensity if <130 constant EUR/ha, otherwise medium intensity).

67 CMEF indicator C.33 Farming intensity (CTX_ENV_33_1a-c and CTX_ENV_33_2).

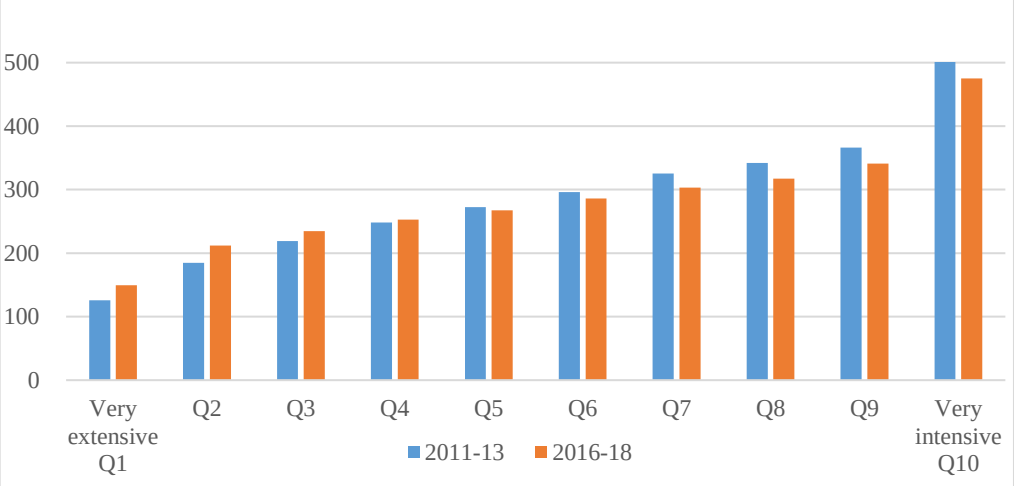
Figure 9 Share of agricultural area managed by low, medium and high intensity farms, 2017



Source: CMEF indicator C.33 Farming intensity (CTX_ENV_33_1a-c)

In this programming period, the level of direct payments per ha received by the 10% most intensive farms declined by 7% to EUR 475 per hectare in 2016-2018, compared to the pre-CAP reform level over 2011-2013. It declined also for more than 50% of farms in the EU. By contrast, it increased by close to 20% for the 10% most extensive EU farmers, to EUR 149 per hectare. This is mainly the result of internal convergence (i.e. the obligation for Member States to reduce the differences in the direct payment level per hectare).

Figure 10 Level of direct payment per hectare by class of intensification (EUR/ha)



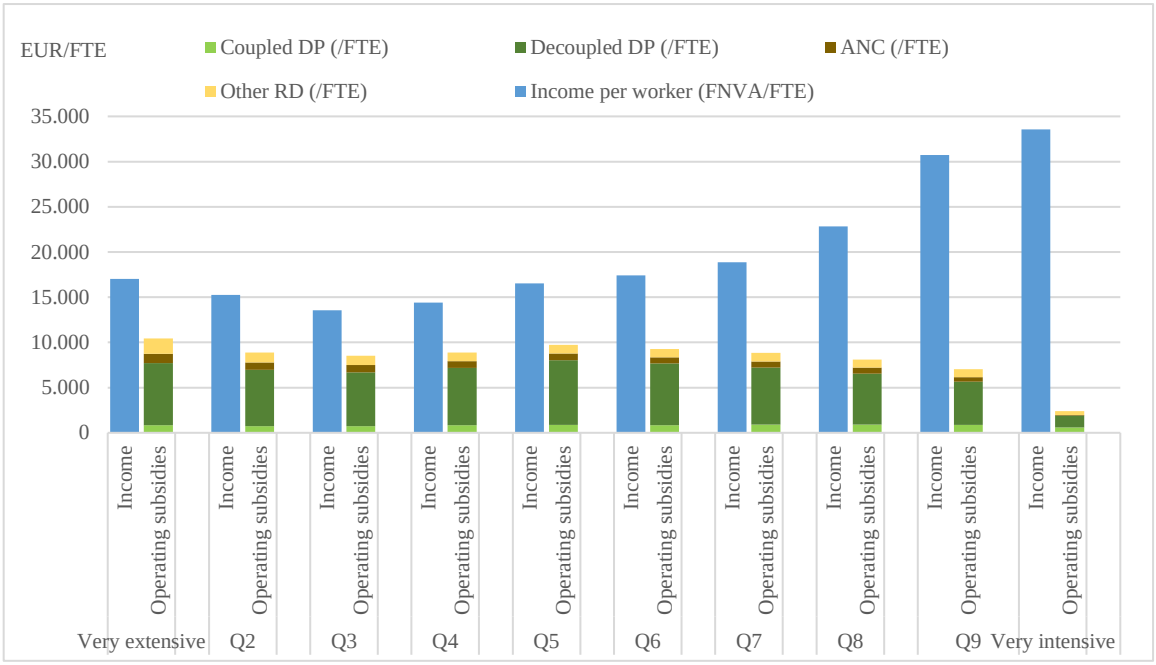
Note: Farms are classified according to their level of intermediate costs[68] per hectare. The deciles are determined based on the population in such a way that there are equal numbers of farms represented in each decile.

Source: Directorate-General for Agriculture and Rural Development, based on FADN data

[68] It covers total specific costs (fertilizers, plant protection products, seeds, feed for livestock, other specific crop and livestock costs) and farming overheads not linked to a specific agricultural activity such as energy, contract work, machinery and buildings maintenance, water, insurance and other farming overheads.

The level of direct payments per hectare remains 3 times higher for the 10% most intensive farms compared to the 10% most extensive ones. However, by contrast, the direct payments per worker at EUR 1 900 are close to 78% lower for the most intensive farmers[69] than for the most extensive ones (EUR 7 700). In addition, direct payments represent 6% of the income of the 10% most intensive farms, while it represents up to 45% of the income of the 10% of most extensive farms (reaching 61% and accounting for the support to areas facing natural constraints and payments for agri-environmental commitments).

Figure 11 Income and subsidies by worker by class of intensification



Note: The income is measured with the farm net value added (FNVA) by full time equivalent (FTE). The operating subsidies cover the coupled and decoupled direct payments (DP), the support to areas facing natural constraints (ANC) and other rural development (RD) support such as agri-environmental payments.

Source: Directorate-General for Agriculture and Rural Development, based on FADN data

Voluntary coupled support has been assessed as potentially relevant to maintain some specific types of farming beneficial for natural resources, with effects varying according to the implementation choices of Member States. However, voluntary coupled support can lead to a higher density of livestock units and increase the corresponding pressure on natural resources, like water contamination by nitrates. It is important that Member States set eligibility criteria to avoid drawbacks on natural resources, e.g., water. Clear evidence of beneficial biodiversity impacts is lacking for most Member States, but there are some positive examples from case studies, e.g. in the Netherlands, the measure is supporting farmers who graze cows or sheep on natural land (e.g. dunes, heaths and salt marshes) that is otherwise ineligible for direct payments, thereby helping to prevent abandonment and maintain the habitats. Livestock production can have a positive impact on biodiversity through the maintenance of permanent grasslands and hedges and through the optimized use of manure[70]. Regarding soil, the measure is considered to have

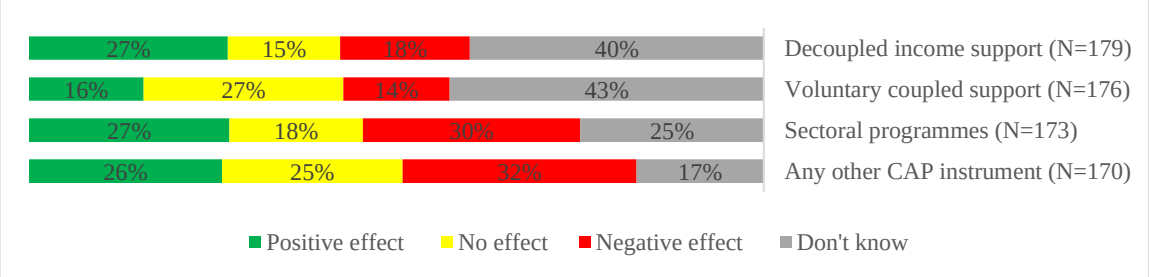
[69] This is linked to the smaller physical average size of the 10% most intensive farms (10 hectares versus 62 hectares for the 10% most extensive). The 10% most intensive farms are also more labour intensive, with on average 2.5 full time equivalent per farm compared to 1.2 for the 10% most extensive.

[70] Dr. J-L. Peyraud and Dr. M. MacLeod, 'Future of EU livestock: how to contribute to a sustainable agricultural sector', 2020.

supported the maintenance of sustainable activities in terms of land use (e.g. maintenance of grassland in relation to the measure for beef in Belgium). But representatives of managing authorities and farmers in Wallonia (Belgium) indicated that the measure is acting as an incentive for intensive farming, and farmer representatives in Spain-Aragon indicated that the measure does not prevent land abandonment. Furthermore, for all the examples of voluntary coupled support found in the case studies, none included provisions to limit the supported production's negative effects on soil.

With respect to pillar I instruments that do not target the objective of sustainable management of natural resources, a large share of respondents to the *public consultation* could not determine what effect the implementation of the decoupled income support and the voluntary coupled support had on natural resources (40% and 43% respectively). For sectoral programmes and other CAP instruments, the responses were mixed. But in both cases, the highest shares were given to 'negative effect' (30% and 32% respectively).

Figure 12 Effect of pillar I instruments on sustainable management of natural resources



Source: public consultation[14]

Operational programmes under the common market organisation contribute to sustainable natural resource management objectives by supporting integrated production, organic production, actions to conserve soil and actions to create or maintain habitats for biodiversity or to maintain landscapes. Spending on these actions has mostly declined since 2014, with the exception of soil conservation (+62% in 2014-2017 compared to 2010-2013). Over the same period, spending on integrated production declined by 10%, organic production by 54% and habitats by 7%. Case studies for the study on water show that some Member States determined eligible criteria to ensure that installation and/or improvement of any system supported in operational programmes for fruits and vegetables allows for better management of water resources. However, the diversity of the operations supported and the lack of information prevent an accurate assessment of their effectiveness.

5.1.1.6. Overview

Overall, support for AECM (M10) and organic farming (M11) appear to be the most effective CAP measures contributing to the sustainable management of natural resources, with cross-compliance providing a minimum level of environmental protection. Their effectiveness is shown to increase when complemented by support to knowledge transfer (M1), advisory services (M2) and the provision of advice through the farm advisory system. The implementation choices of Member States greatly determine the effectiveness of the instruments and measures.

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https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/farmers-and-farming/future-eu-livestock-how-contribute-sustainable-agricultural-sector_en.

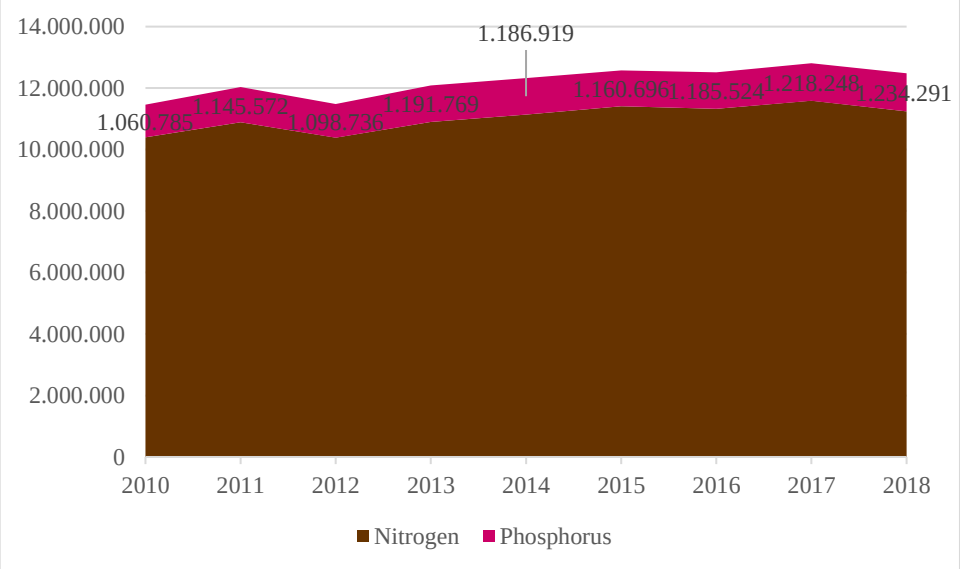
Responses to the public consultation on the main ***drivers of success*** in the implementation of CAP instruments and measures for the sustainable management of natural resources confirm the benefits of 'voluntary commitments (e.g. AECM, organic farming)' which received the highest rate of responses (55%). Considered next most beneficial were 'measures targeted and tailored to local context/needs' (45%) and 'advice (quality, independence) and knowledge transfer' (44%), supported mostly by the stakeholder groups: company/business organisations, public authorities and EU citizens. Contrary to the findings of the studies, SMRs (29%) and GAECs (23%) did not attract a notable level of replies.

On the question about the ***main factors that limit*** the contribution to the sustainable management of natural resources through the implementation of the current CAP instruments and measures, the answers imply significant limitations due to an 'insufficient level of financial incentives' (59%), the 'low ambition of the measures' (44%), 'an insufficient budget allocation', 'the lack/ quality/ independency of farm advice' and a 'disproportionate administrative burden for beneficiaries (fear of excessive controls)' (42% each). On the opposite end, 'too broad exemptions (i.e. sectors and areas excluded from requirements)' (25%), 'difficult eligibility criteria to benefit from measures and/or to access financing (grants, loans, etc.)' (20%), 'delay in the payment of support' and 'too restrictive eligibility and selection criteria' (19% each) are less limiting but do not seem irrelevant either.

Recent research provides *behavioural evidence on the potential trade-offs between mandatory and voluntary schemes of the CAP* and reveals that more conditionality may decrease farmers' level of enrolment in voluntary schemes. But overall adoption of environmentally friendly practices may nonetheless increase if there is a substantial increase in conditionality[71].

5.1.2. Input use

Figure 13 Consumption of inorganic fertilisers (tonnes)

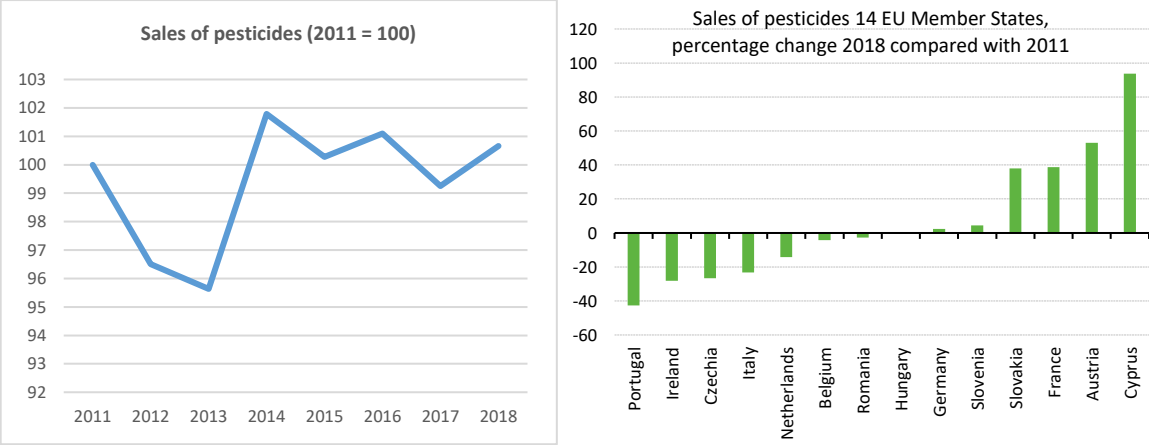


Source: Directorate-General for Agriculture and Rural Development on the basis of Eurostat aei_fm_usefert

[71] JRC Science for Policy Report, Farmers and the new green architecture of the EU common agricultural policy: a behavioural experiment, 2021. https://publications.jrc.ec.europa.eu/repository/handle/JRC123832.

Regarding *fertiliser use*, in 2018, 11.2 million tonnes of nitrogen and 1.2 million tonnes of phosphorus fertiliser were used in EU agriculture, corresponding to a 3% increase in the use of nitrogen fertiliser and a 4% increase in phosphorus use compared to 2014. The figures show a decline for nitrogen in 2018, but it would be premature to infer that the trend is changing[72].

Figure 14 Sales of pesticides in the EU



Note: Sales of pesticides based on Member States providing data throughout 2011-2018.
Source: Directorate-General for Agriculture and Rural Development, on the basis of Eurostat (aei_fm_salpest09)

Consumption of pesticides is measured by the sales of pesticides in tonnes and covers the following plant protection products: fungicides and bactericides, herbicides, haulm destructors and moss killers, insecticides and acaricides, molluscicides, plant growth regulators and other plant protection products. Data gaps limit a solid estimation of total pesticide use in the EU, but available data depicts relative stability with annual swings and variations at Member State level.

With respect to sales by group of substances with various risk categories, in 2018, non-approved substances declined to 47 percentage points, while low-risk active substances increased to 307 percentage points compared to their 2011-2013 averages. Candidates for substitution and all other approved substances increased slightly, to 107 and 109 percentage points respectively[73].

CAP instruments and measures addressing the use of plant protection products and fertilisers

Cross-compliance helps to limit the use of fertilisers in nitrate-vulnerable zones (49% of EU arable land). As of 2018, plant protection products are banned on EFAs (10% of arable land). The share of EFAs in arable land under nitrogen-fixing crops declined to 2.3% in 2018 from 4.5% in 2017. Crop diversification produced limited effects, as changes in cropping patterns concerned a small share of land and did not entail the implementation of crop rotation.

AECMs (M10) also supported the management of inputs on 14% of arable and permanent land in the EU in 2018. However, FADN data analysis shows no significant change in fertiliser or plant protection product expenses for holdings entering an AECM. FADN data also shows that the average share of manure in fertiliser expenses increased for

[72] Eurostat AEI_FM_USEFERT.

[73] CTX_ENV_48_1a-d.

farms entering an AECM in all the case study Member States, except Czechia. But there is no data on the quantity of manure produced and used on farms. Support for organic farming (M11) helps to reduce pesticide and fertiliser use, as confirmed by FADN data analysis. The analysis depicts a tendency towards lower fertiliser and plant protection product expenses for farmers converting to organic farming in all case study Member States, except Italy[74]. This finding is supported in the EU Agricultural and Farm Economics Brief on *Fertiliser input estimates in farms*. According to the brief, the use of nitrate, phosphorus and potassium-based soil inputs in the organic sector is lower in all sectors, with an especially high gap between organic and conventional farms' use of these inputs in the milk sector[75].

The case studies in the *study on soil* found examples of the fruit and vegetable operational programmes under the common market organisation promoting a better use of plant protection products and fertilisers. In Spain-Aragon, there was support for 'generic integrated production' on 5 326 hectares (2.7% of permanent crops), support for using biotechnology or biological control methods instead of conventional ones in fruits and vegetables cultures on 937 hectares and support for using the peach-bagging technique as a physical barrier against pests on 1 124 hectares.

The *study on water* found that the sectors that spend the highest amounts on fertiliser and pesticides (i.e. flowers, fruits, vegetables and wine) are not eligible for direct payments in several Member States (Germany, France, Portugal, Slovenia, the UK). Therefore the measures with the highest positive effects on beneficial agricultural practices (notably cross-compliance and EFAs) have limited capacity to reduce fertiliser and pesticide use in these sectors. In France and Spain, fertiliser and pesticide reduction is targeted through operational programmes of producer organisations in the fruits and vegetables sector.

In the cereals-oilseeds-protein crops sector, cross-compliance and greening measures seem to impact fertiliser and pesticide use, except in France and the Netherlands, where they were assessed as ineffective in influencing positive farming practices. Direct payments, and notably the permanent grassland greening measure, played a significant role in Germany, Croatia, Austria and Poland for the maintenance of holdings specialised in extensive grazing; on average, such holdings have low expenditures in fertilisers and pesticides.

Concrete examples are provided in the *summary report of the enhanced AIR* submitted in 2019 (synthesis of chapter 7)[76] where numerous managing authorities reported significant support for better managing and reducing the use of pesticides and fertilisers in agriculture. Consistent reductions of chemical inputs (fertilisers and pesticides) were reported in Greece, Croatia, Brandenburg/Berlin and Schleswig-Holstein (Germany), Asturias (Spain), Sardegna (Italy), Slovenia, among other places.

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74 Furthermore, the plant protection products allowed in organic farming are less harmful than those allowed in conventional farming.

75 EU Agricultural and Farm Economics Briefs No 19, July 2021 - Fertiliser input estimates in farms (An overview of costs and quantities of the three main fertilizer components used in the EU farms based on FADN data). https://ec.europa.eu/info/sites/default/files/food-farming-fisheries/farming/documents/agri-farm-economics-brief-19_en.pdf.

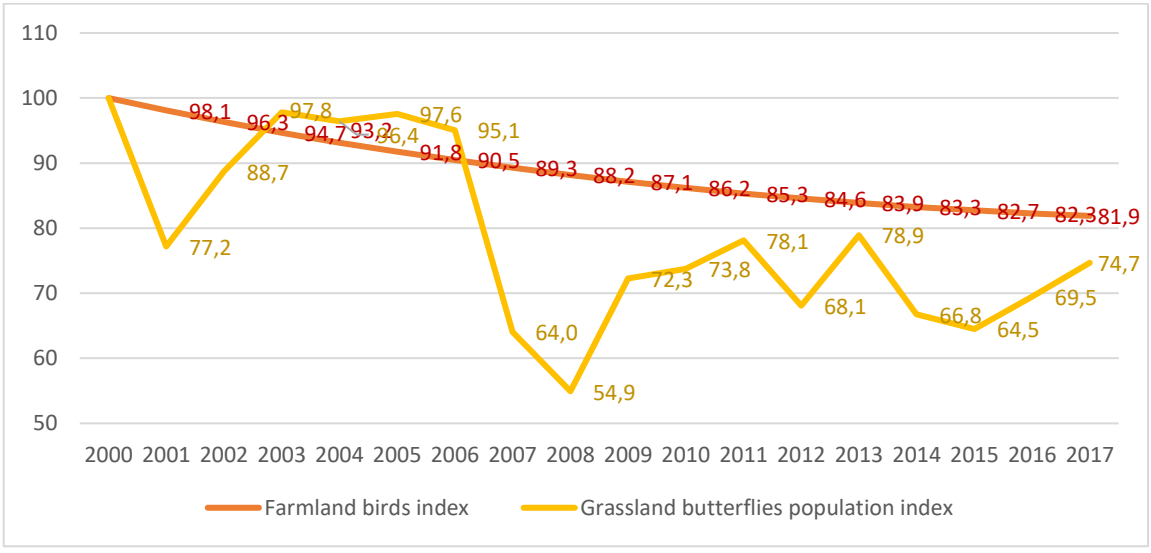
76 https://enrd.ec.europa.eu/evaluation/publications/summary-report-synthesis-evaluation-components-enhanced-airs-2019-chapter-7_en.

For instance, Croatia reduced nitrogen intake by 4.43% and reduced nitrogen use from mineral fertilisers by 9.01% in nitrate vulnerable zones, whereas the phosphorous intake and the use of phosphorous from mineral fertilisers were reduced by 5.10% and 9.29% respectively. Aquitaine (France) assessed the behavioural changes among farmers in terms of water consumption and water pollution in their operation, showing that RDPs decreased the use of inputs (93%), reduced the nitrogen fluxes released to the environment (70%), and increased the efficiency and sustainability of the use of water resources (60%). Germany-Sachsen showed large-scale contributions to the material discharge into water, thus improving its quality. In around 118 900 hectares of arable land and grassland under RDP management contracts, no pesticides were used except those permitted in organic farming. Of over 29 900 hectares of grassland managed with nitrogen fertilization, RDPs supported approximately 23 500 hectares subject to significant fertilization restrictions, of which more than 14 000 hectares are now fertilizer-free. Improving erosion protection over grass strips by promoting direct sowing and low tillage cultivation methods and having soil covered by arable crops year-round reduced the phosphorus content buffered against substance inputs in arable land and grass strips.

5.1.3. Restoring, preserving and increasing biodiversity

According to the European Environment Agency, trends in *bird and butterfly populations* can be excellent barometers of the health of the environment, as they are sensitive to environmental change, and their population numbers can reflect changes in ecosystems as well as in other animal and plant populations.

Figure 15 Farmland birds and grassland butterflies indices (2000=100)



Source: CMEF C.35 Farmland birds index (CTX_ENV_35_1) and European Butterfly Monitoring Scheme (index rebased to 2000=100)

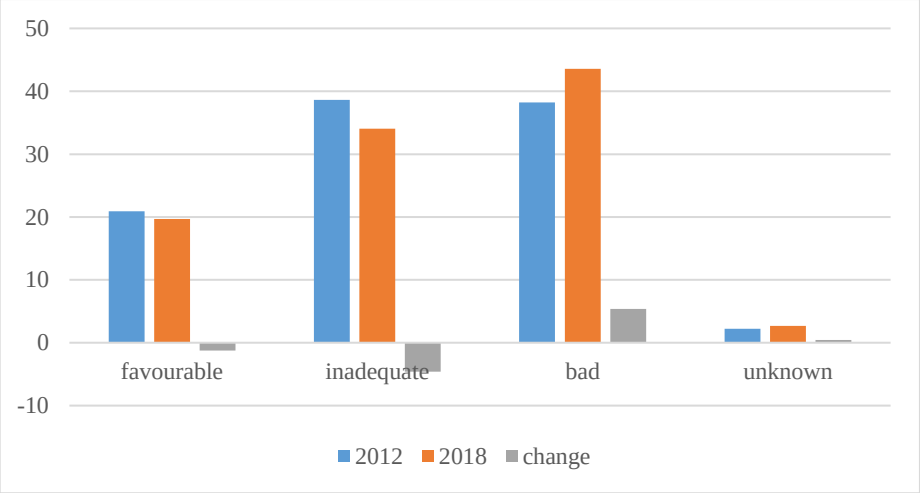
After decades of dramatic decline, the farmland birds index[77] displayed a gradual recovery during the first 3 years of implementation of the 2014-2020 CAP to 85.1. But then it fell back in 2017, reaching a new low of 81.8. Comparing the average of the first 4 years of the 2014-2020 CAP to the preceding four-year average, the index fell by 0.3 pp (from 83.8 to 83.5). For comparison, during the same period, the common forest birds

[77] CMEF indicator C.35 Farmland birds index (CTX_ENV_35_1).

index (1990=100), on the basis of data from the European Bird Census Council, displayed a recovery of 6.0 pp[78].

The grassland butterflies population index fell sharply in the first 2 years of the 2014-2020 CAP, but has recovered since. Nonetheless, the 2014-2017 average remains 5.0 pp below the 2010-2013 average and 30 pp below the level of the year 2000[79].

Figure 16 Conservation status of grassland (% of assessments of habitats)



Source: CMEF C.36 Conservation status of agricultural habitats; CTX_ENV_36_1a-d

The data depict a deterioration in the status of habitats. In 2018, the conservation status of agricultural habitats (grassland) was deemed 'favourable' in 19.7% of assessments of habitats (-1.2 pp from 2012), compared to 34.0% 'unfavourable – inadequate' (-4.6 pp) and 43.6% 'unfavourable – bad' (+5.4 pp), with 2.7% unknown (+0.5 pp).

In 2015, the *area of forest and other wooded land protected for biodiversity, landscape and specific natural elements* accounted for around 24.5 million hectares and represented around 17% of the total area of forest and other wooded land. The share of forest and other wooded land protected to conserve biodiversity, landscapes and specific natural elements stood at 12.8% for biodiversity conservation (+0.3 pp from 2010) and 4.2% for protection of landscapes and specific natural elements (-4.4 pp).

Contribution of CAP instruments and measures to CAP objectives on biodiversity

In all of the case study Member States examined in the study on biodiversity, the evolution of relevant indicators and the ongoing declines in many taxa in semi-natural habitats, and especially in more intensively managed farmland and forests, reveal that the CAP instruments and measures are not being used in a way that is sufficient to counteract the pressures on biodiversity from agriculture and forestry (as well as other factors unrelated to agriculture or the CAP)[80].

78 https://pecbms.info/european-wild-bird-indicators-2019-update/.

79 Data from European Butterfly Monitoring Scheme. https://butterfly-monitoring.net/.

80 For details on the analysis, see the reply to evaluation question 4 in the study on biodiversity (see footnote 11).

However, as also acknowledged by the European Environment Agency, the positive impacts of the 2014-2020 CAP on common species associated with farmland might become visible in the 2020-2030 period[81].

The share of agricultural land under management contracts supporting biodiversity and/or landscapes (focus area 4A) reached 17.4% in 2019 (from 5.63% in 2015) and the same indicator for forest or other wooded area stood at 0.5%[82]

According to the *summary report of the enhanced AIR* submitted in 2019 (synthesis of chapter 7)[63], the evaluations by managing authorities evidenced that RDPs contributed somewhat to improving biodiversity and ecosystems with mixed results. Some managing authorities estimated positive net effects on the increase of the farmland bird index (e.g. Castilla la Mancha (Spain)). Others showed that RDPs mainly helped to maintain the population trends in some species stable (e.g. Cyprus). Despite the positive contributions, many AIRs stated that the overall decline of the farmland bird index in agriculture was not halted (e.g. Czechia, Mainland Finland, Emilia Romagna (Italy)).

Members States' evaluations pointed out that RDPs were successful in maintaining and enhancing farming areas of high nature value (HNV) through measures like AECM, organic farming and Natura2000 (e.g. La Rioja, Andalucia and Navarra (Spain), Lazio, Marche, Apulia and Valle D'Aosta (Italy), Latvia, Slovakia, Slovenia). Genetic resources in plants and animals were preserved through RDP support (e.g. in Castilla la Mancha and Navarra (Spain), Marche (Italy), Slovenia).

The *study on biodiversity* found that a number of case study Member States (Ireland, France, Portugal and Slovakia) have focused their pillar II measures on habitats and species, especially in Natura 2000 sites. But the scale of their implementation has often been insufficient due to limited budgets allocated to AECM and/or low uptake by farmers. The use of the Natura 2000 measure has been very limited, especially in forests, and therefore its impact so far has been low. The impact of ESPG is also constrained by its relatively low designation in Natura 2000 sites in some Member States and minimal ESPG designation outside the network in nearly all Member States. While fallow land and/or low intensity multiannual nitrogen-fixing forage crops in low intensity arable farmland are favoured habitats for such species, which can be provided as EFAs, there is little direct evidence of the impacts of the measure on relevant species.

All case study Member States used a wide array of CAP instruments and measures to protect and maintain grassland habitats and species, to protect farmland birds, to preserve and manage plant and animal genetic resources and to minimise the impacts of agricultural pollution on biodiversity. However, 3 Member States were not using the forest measures to address pressures on forest habitats and species, 3 Member States were not using the CAP to support priority restoration of peatlands and wetlands, and 5 Member States were not using cross-compliance to require action against priority invasive alien species.

Through its case studies, the *study on biodiversity* finds AECMs (M10) to be the most effective measure, particularly when it is used to put in place schemes focused on

[81] https://www.eea.europa.eu/data-and-maps/indicators/abundance-and-distribution-of-selected-species-8/assessment-1.

[82] CMEF indicators R.07 Percentage agricultural land under management contracts supporting biodiversity and/or landscapes (R.07_PII) and R.06 Percentage forest or other wooded area under management contracts supporting biodiversity (R.06_PII).

biodiversity requirements, especially higher-level schemes tailored to biodiversity needs. Examples include:

- Result-based agri-environment pilot schemes for habitat quality, which are characterised by the annual payments to farmers being directly linked to the quality of the biodiversity on their farms (instead of compliance). These pilot projects (seven EU-funded projects in four Member States, 2014-2018) increased sustainable management of biodiversity on farms. The results were especially successful in Ireland, and farmers generally indicated they would enter a results-based M10 scheme, if it was available.
- A combination of broad conservation measures led to improvements in the conservation status of a dragonfly (Green Gomphid, *Ophiogomphus Cecilia*) in Denmark. All the measures were taken to reduce nutrient loads and therefore support the improvement of the conservation status of numerous aquatic habitats and species, including the mentioned dragonfly species. To achieve this, measures taken included the protection of key habitats within the Natura 2000 network, restoring/improving water quality and hydrological regimes in large river systems, reducing nutrient loads, restoring key habitats, and reintroducing species where needed to restored areas, which were financed.
- In Luxembourg, through the development of M10 contracts, management measures extended for grassland habitats in the context of the Eislek LIFE project (2012 to 2017). It aimed to restore suitable grassland and wetland habitats in 11 Natura 2000 sites to support nationally endangered butterfly species such as the Violet Copper (*Lycaena helle*).

Coexistence between farming systems and protected species

A wide range of CAP instruments and measures have significant potential to support improved ***coexistence between farming systems and protected species*** and to raise awareness among rural communities of the conservation value and potential economic benefits of wild mammals and birds and of agricultural landscapes that are rich in habitats.

In the specific areas and farming systems where co-existence is a problem, the focus tends to be on targeted investment in damage prevention and on AECM support for associated extensive, low-input management systems.

However, the opportunity has not been taken to use a wider range of CAP instruments and measures, for example to provide specialist advisory services, Natura 2000 management plans and compensation payments. They could also be used to promote knowledge transfer via local cooperation initiatives and landscape-scale approaches to implementation and to provide support for marketing local products and developing eco-tourism associated with co-existence efforts.

Member States' CAP support for wild pollinator habitats is mostly provided through targeted AECM schemes to maintain existing semi-natural habitats and landscape features, to create new habitats, and through the new melliferous fallow option for EFAs.

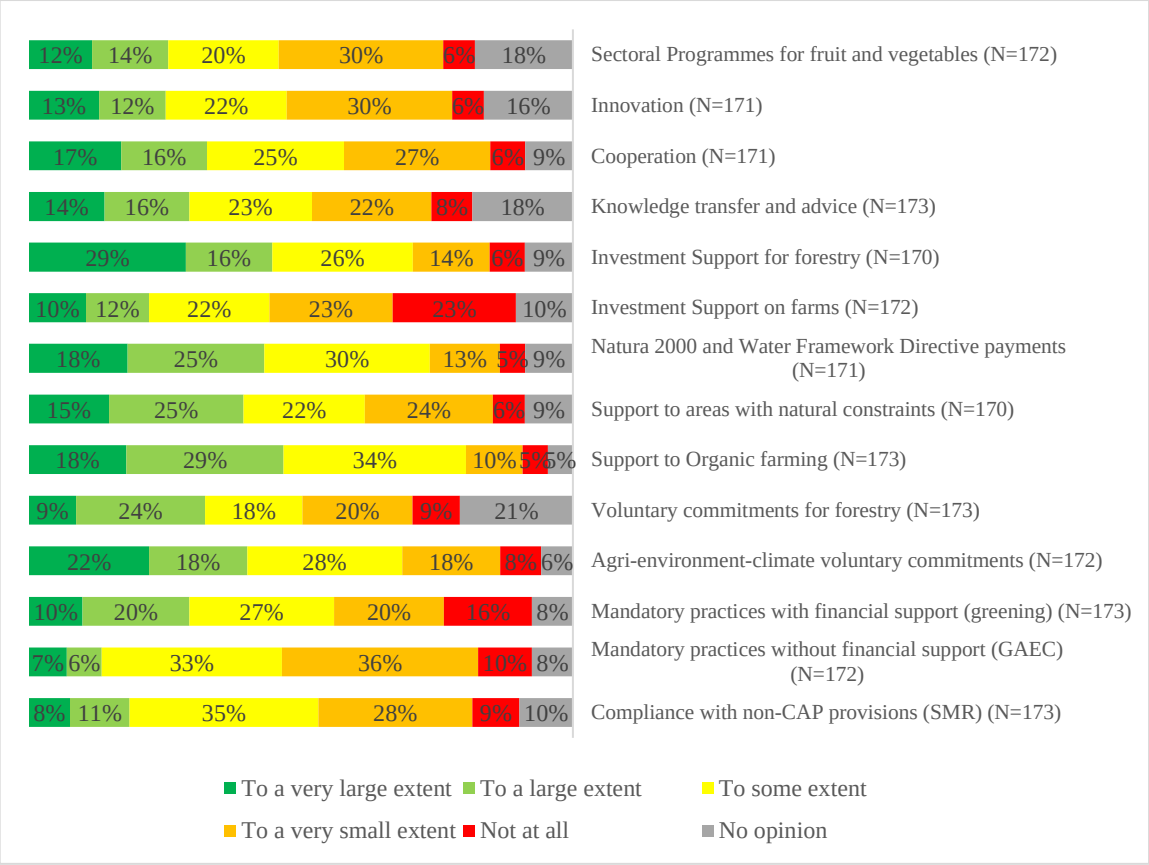
However, implementation by Member States and uptake by farmers is insufficient to meet the challenge of supporting recovery of the wild populations. No evidence was found of targeted CAP support for wild biological control agents, but the provision of habitats for wild pollinators is also likely to benefit this group of species.

An increasingly important role in coexistence with large carnivores, geese and pollinators is being played by recently established EU-level, national and regional networks that support effective practical cooperation, often bringing stakeholders, farmers and experts together to develop and implement management plans and share best practice.

The perception of respondents to the *public consultation* is broadly in line with the analysis mentioned above, with some differences in the ranking of measures. On the question on the effectiveness of the CAP instruments that contribute to the sustainable management of biodiversity, habitats and landscapes, the measures perceived as most effective were the support to organic farming (47%), investment support for forestry (afforestation, agroforestry) (45%), Natura 2000 (43%) and AECMs (40%).

On the opposite end, the mandatory practices without financial support (GAEC) and investment support on farms were perceived as effective 'to a very small extent' or 'not at all' (46% and 45% respectively).

Figure 17 Effectiveness of CAP instruments contributing to sustainable management of biodiversity, habitats and landscapes



Source: public consultation[14]

5.1.4. Preventing soil erosion and improving soil management

Soil organic matter is a key component of soil as it influences its structure, aggregate stability, nutrient availability, water retention and resilience. In 2015, the total organic carbon content in arable land stood at 14 065.0 mega tonnes in 2015 (+0.3% from 2012) with a mean organic carbon content of 43.1 g/kg (-0.4%)[83].

[83] CMEF indicators C.41 Soil organic matter in arable land (CTX_ENV_41_1a and 1b).

Soil erosion by water is one of the most widespread forms of soil degradation in Europe. The results from a study[84] on soil loss by water erosion for the year 2016 indicated a slight decrease, both in the mean continental soil loss rate (and, as a consequence in the total soil loss), and in the area affected by severe erosion in the 2010-2016 period, compared to a 9% decrease between 2000-2010. The study considers that the decrease is due to the small increase of applied soil conservation practices in most Member States and some small land cover changes (increase of urban areas, a minor decrease of shrublands and conversion of arable lands to pastures). However, CMEF indicators reveal that the share of estimated agricultural area affected by moderate to severe water erosion (>11 t/ha/year) stood at 8.0% of total agricultural area in 2016 (+1.3 pp from 2010)[85].

Contribution of CAP instruments and measures to sustainable soil management

The share of agricultural land under management contracts to improve soil management and/or prevent soil erosion (focus area 4C[86]) reached 13.8% in 2019[87] (near to fulfilling the common target indicator of 14.3%).

According to the *summary report of the enhanced AIR* submitted in 2019 (synthesis of chapter 7)[63], RDPs helped to improve soil management mainly in agricultural land (e.g. Czechia, Baden Württemberg (Germany), Tuscany (Italy), Croatia, Luxembourg). However, since changes in soil organic carbon can be observed only on the long run, only a few AIRs were able to show the RDP impacts already in 2019.

Positive contributions in preventing soil erosion were reported in numerous AIRs. But some managing authorities reported limited direct effects on the prevention of soil erosion due to the small coverage of interventions over the total UAA or the low targeting of RDP support to areas with higher erosion risks.

Austria reported that soil erosion by water was reduced by an annual average of 1.6 tonnes per hectare (i.e. from 7.5 to 5.9 tonnes), particularly in endangered regions due to the higher proportion of field crops with high soil protection and organic farming. In Czechia, agri-environment-climate schemes reduced the long-term average soil loss on agricultural land by 4.7 tonnes/ha per year, with positive effects on all aspects of soil erosion by water, such as soil degradation, water fouling, and watercourses erosion.

RDPs prevented soil erosion in agricultural land mainly through organic farming (e.g. Baden Württemberg and Brandenburg (Germany), PACA (France), Molise (Italy)) and by maintaining woody elements, grass strips, hedgerows, or anti-soil erosion systems (e.g. Wallonia (Belgium), Basse Normandie (France)). For example, Basse Normandie reported that agri-environmental and climatic measures maintained 138 linear km of hedgerows and 4 km of riparian forest, providing an important anti-erosive impact.

Various measures supported effective soil management practices, specifically extensive livestock management (e.g. Andalusia (Spain), Bolzano (Italy), Acores (Portugal)),

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84 P. Panagos, C. Ballabio, J. Poesen, E. Lugato, S. Scarpa, L. Montanarella and P. Borrelli; A Soil Erosion Indicator for Supporting Agricultural, Environmental and Climate Policies in the European Union; 2020.

85 CMEF indicator C.42 Soil erosion by water (CTX_ENV_42_2b).

86 Preventing soil erosion and improving soil management.

87 CMEF indicator R.10 Percentage of agricultural land under management contracts to improve soil management and/or prevent soil erosion (R.10_PII).

recovery of terraces (e.g. Baleares (Spain)), or rotation of crops (Castilla Leon (Spain)). In Liguria (Italy), RDP support to organic farming, integrated farming, and management of permanent grassland increased the amount of organic matter by 0.651 tonnes/ha per year.

Positive effects on soil erosion were attributed also to farm advisory actions (e.g. Schleswig Holstein (Germany), Canarias and Castilla Leon (Spain)).

Achievements were also assessed in terms of increased capacity of farmers to manage soil thanks to training and farm advisory services (e.g. Andalucia (Spain)), qualitative improvement of soil erosion parameters (e.g. Sachsen-Anhalt (Germany)), and prevention of soil consumption from investments in physical assets (e.g. Piemonte (Italy)).

The *study on soil*[88] found that several CAP instruments and measures have a positive impact on soil-quality components, but the overall contribution of the CAP may be limited due to the areas concerned by their implementation.

The CAP has favoured agricultural practices limiting ***soil erosion***, i.e. soil coverage and maintenance of landscape elements, notably through GAEC 1 (buffer strips), EFAs and AECMs, which help reduce runoff and erosion by wind. The literature and the case studies indicate that GAECs 4 (soil cover) and 5 (land management), AECM (M10.1) and organic farming (M11) could help to reduce soil erosion but had a modest effect because of the limited area concerned by pillar II measures and their low level of targeting vulnerable areas.

The EFAs, GAEC 4 (soil cover), AECMs (M10.1) and organic farming (M11) contribute to practices limiting the loss of ***soil organic matter*** by promoting the use of organic fertiliser or soil cover. The study could not establish a link between CAP implementation over the 2014-2020 period and results on soil organic matter, as the effect of relevant practices on soil organic matter can only appear over the long term.

Soil pollution is mainly tackled by SMRs 1 (nitrates) and 10 (plant protection products), EFAs and organic farming (M11), which restrict the use of fertilisers and plant protection[89] products. The maintenance of landscape features promoted by GAEC 1 (buffer strips) and AECMs can also help to reduce soil pollution. Operational programmes specific to the fruits and vegetables sector and investment measures (M4) also contributed. Several managing authorities reported that pillar II measures allow significant support for improving the management and reducing the use of pesticides and fertilisers in agriculture; for example in Aquitaine (France) (decreased the use of inputs and reduced the nitrogen fluxes released to the environment), in Belgium (reduced the use of fertilisers).

The key CAP instruments impacting ***soil nutrient balance*** are SMR 1 (nitrates), EFAs and support for organic farming requirements to control mineral fertilisers' application, the GAEC 1 (buffer strips) requirement to maintain landscape features and AECMs supporting the maintenance of landscape elements. To a lesser extent, GAECs 4 (soil cover), 5 (land management) and 6 (soil organic matter), crop diversification, operational

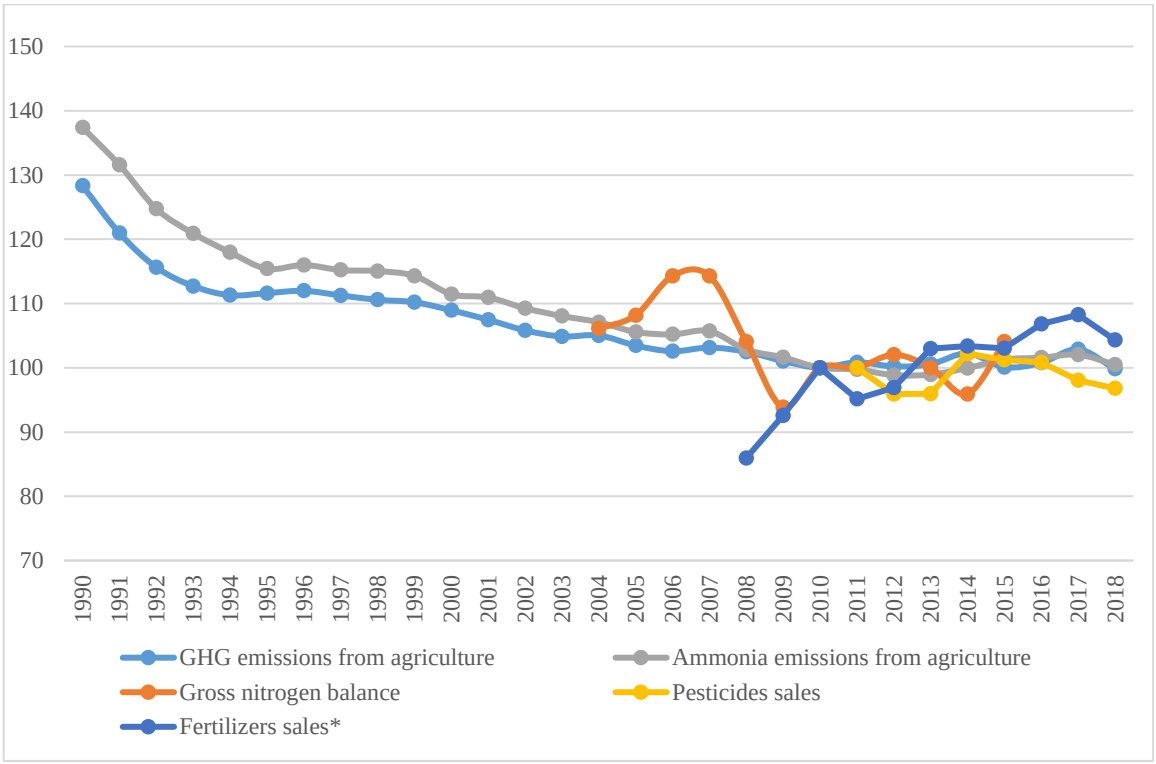
[88] For details on the analysis, see the reply to evaluation question 4 in the study on soil (see footnote 12).

[89] **Error! Reference source not found.** provides an overview of CAP intruments and measures addressing the use of pesticides and fertilisers.

programmes specific to the fruits and vegetables sector and investment measures (M4) also contributed to the implementation of practices and land use sustainable for soil.

A direct link cannot be established between changes in soil nutrient balance and the effect of the CAP implementation. However, the lack of improvement in gross balance between nitrogen added to and removed from agricultural land in the EU since 2010 (while it had decreased between 2003 and 2015) imply a lack of improvement of the CAP over 2014-2020.

Figure 18 Reduction in environmental impact indicators (2010=100)



Note: Data on fertiliser sales excludes Belgium, Luxembourg and Malta
Source: Directorate-General for Agriculture and Rural Development

The impact of the CAP measures and instruments on ***soil compaction and salinisation*** remains very limited, and there is no instrument that clearly addressed this issue.

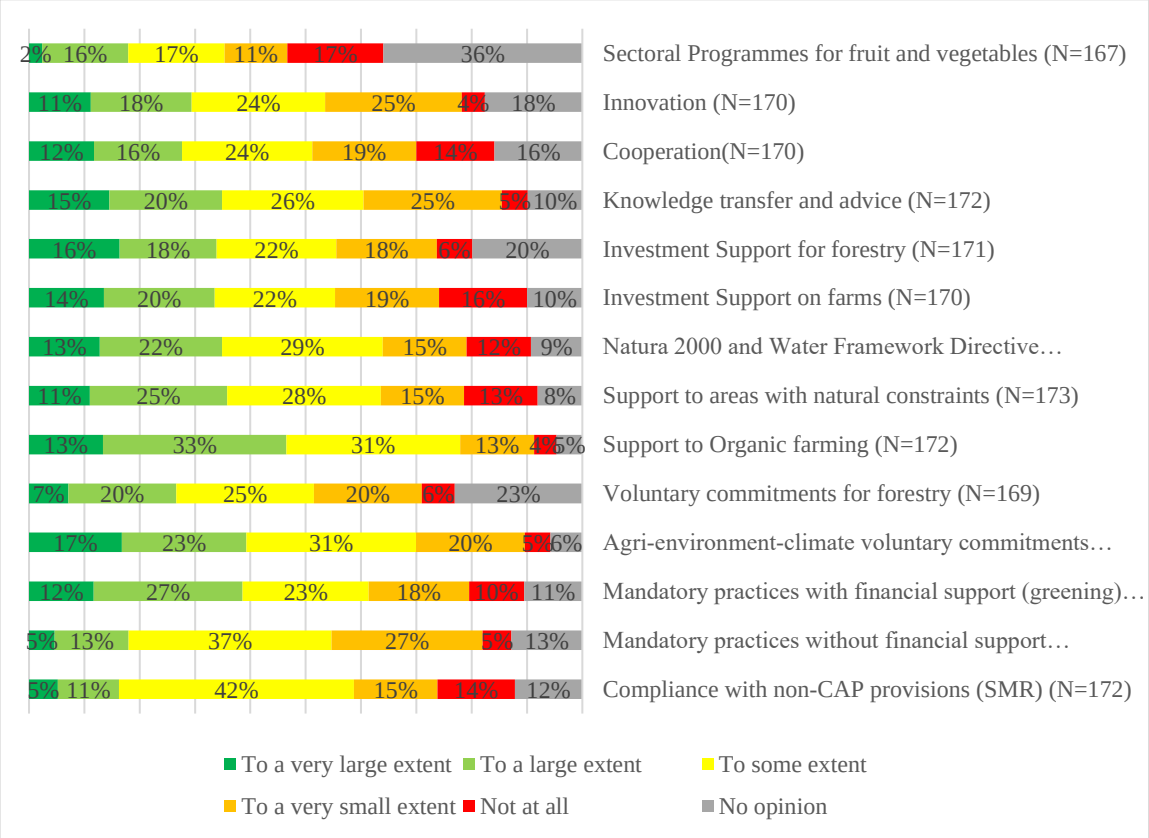
Most of the soil-related practices supported by the CAP can be expected to improve ***soil productivity*** in the long run. CAP measures and instruments promoting nitrogen-fixing crops (e.g. EFAs, pillar II measures, crop diversification, etc.) have the greatest impact on productivity. Other practices concern specific cases or small areas and therefore cannot have an impact on productivity at EU level. Conversely, the CAP does not facilitate to a sufficient extent certain practices that can improve soil productivity; these include diversified crop rotation, intercropping, mulching, reduced tillage or agroforestry.

Activities positive for **soil biodiversity** were fostered by SMR 10 (plant protection products), GAEC 1 (buffer strips), AECMs and organic farming which promote grasslands, the restriction of plant protection products, and landscape features. However, the result of CAP implementation on soil biodiversity lacks data, and so the effect of CAP measures and instruments cannot be established.

The perception of respondents expressed in reply to the *public consultation* acknowledges the impact of the CAP on sustainable soil management. Concerning the question on the effectiveness of the CAP instruments that contribute to sustainable

management of soil resources, the instruments that were perceived as most effective (sum of 'very large' and 'large' extent) by the respondents, were the support to organic farming (47%), agri-environment-climate voluntary commitments (39%) and mandatory practices with financial support (greening) (39%). The instruments that were perceived least effective by respondents (sum of 'very small extent' and 'not at all'), were the investment support on farms (35%), cooperation (33%) and mandatory practices (GAEC) without financial support (33%).

Figure 19 Effectiveness of CAP instruments contributing to sustainable management of soil



Source: public consultation[14]

5.1.5. Improving water quality and management

Water quality in terms of gross nutrient balance was, in 2017, characterised by 49 kg Nitrogen/hectare/year for the potential surplus of nitrogen on agricultural land (no change from 2013) and 1 kg Phosphorus/hectare/year for the potential surplus of phosphorus on agricultural land (50% reduction from 2013)[90]. The share of agricultural land under management contracts to improve water management (focus area 4B[91]) reached 14% in 2019 (from 4.4% in 2015)[92].

Impact of CAP instruments and measures on water quality

In the *summary report of the enhanced AIR* submitted in 2019 (synthesis of chapter 7)[63], an improvement in water quality in supported agricultural and forestry land was reported

[90] CMEF indicator C.40 Water quality (CTX_ENV_40_1a and b).

[91] Improving water management, including fertilisers and pesticide management.

[92] CMEF indicator R.08 Percentage of agricultural land under management contracts to improve water management (R.08_PII).

across numerous AIRs. This was often achieved through a more sustainable use of fertilisers and pesticides (e.g. via vocational training, farm advisory services, organic and integrated farming, management contracts to improve water quality), as well as through investments in physical assets to better manage the discharge of by-products from the livestock sector.

Positive effects on water quality were reported across several AIRs, for example, in Italy-Veneto, where the assessment of the gross nutrient balance on agricultural land showed a decrease in nitrogen (-42.2%) and phosphorous content (-20.7%) in farms receiving support from AECM (M10) and organic farming (M11) compared to non-supported farms. Similar positive RDP effects on the reduction of both nitrogen and phosphorous surplus were reported in Estonia, thanks to the reduction of mineral fertilisers, whereas the RDP implementation did not achieve a significant reduction in the use of pesticides.

In other cases, RDPs reduced the nitrogen surplus in supported land, while no difference was observed on the phosphorus surplus (e.g. Niedersachsen/Bremen (Germany), Hungary, Greece). Minor RDP effects were also reported, often due to the low targeting of measures in protected/vulnerable areas or low level of implementation in forestry land. For instance, spatial analysis in Latvia showed that management contracts to improve water quality are poorly addressing the most sensitive areas (e.g. water bodies at risk and Natura 2000 areas).

Analysis under the *study on water*[93] indicates that the measures helped to alleviate agricultural pressures in three districts (Finland, Italy and Poland), by reducing fertiliser and phytosanitary product expenditures. More modest impacts on reducing phytosanitary product expenditures or fertiliser expenditures were identified in Germany, France, Croatia, the Netherlands and Romania[94].

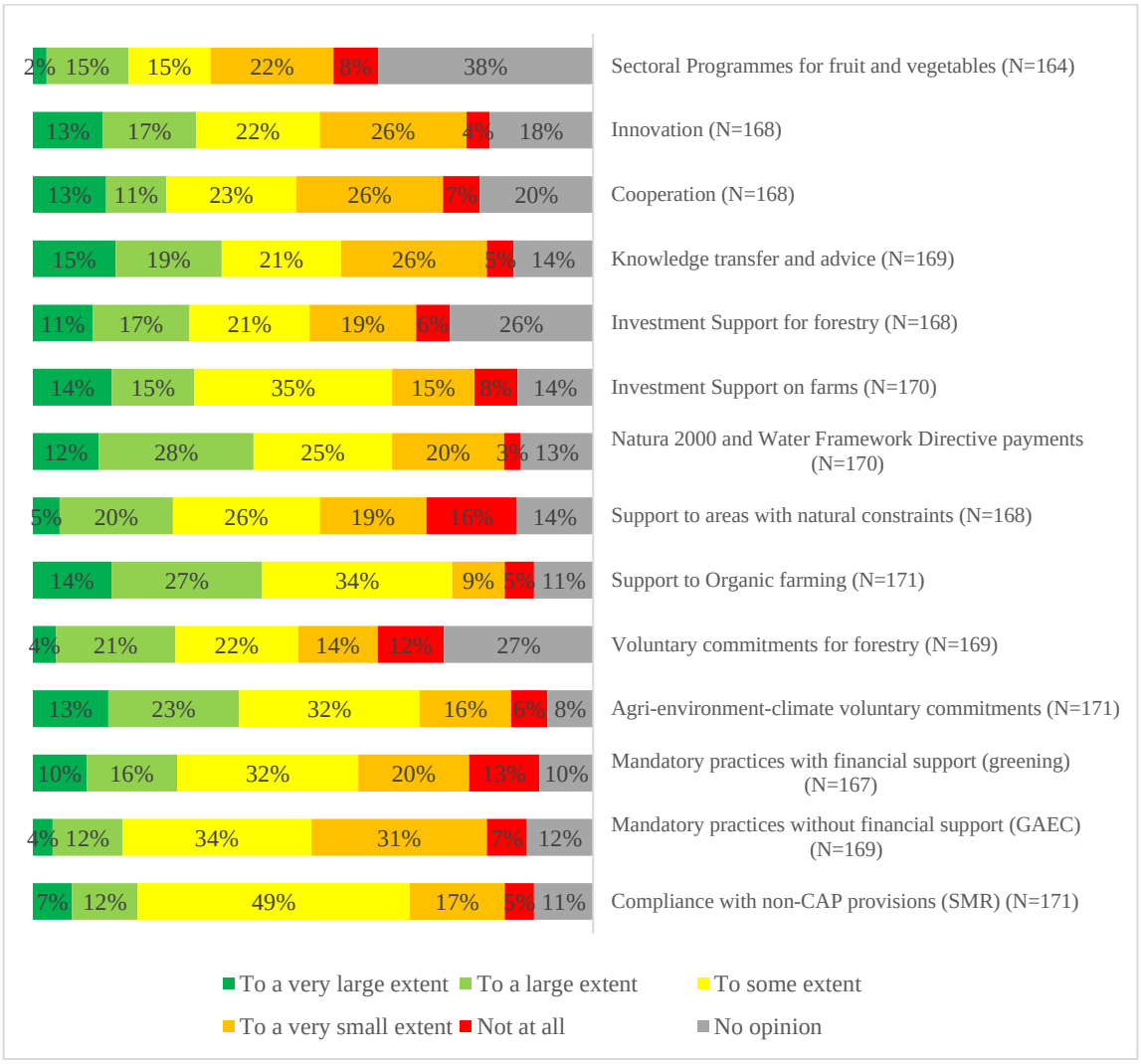
Regarding diffuse agricultural pollution, the analysis did not identify a significant effect of the measures on the reduction of pollutants transferred by runoff and leakage in any of the river basins. This may be due to the latency period for CAP instruments and measures implemented since 2014 being insufficient to fully deliver their expected indirect effects on pollutants transferred by runoff and leakage, if any. The same applies for soil and bank erosion, where a clear impact of the water-related CAP instruments and measures is lacking.

In the *public consultation*, concerning the question on the effectiveness of the CAP instruments that contribute to sustainable management of water in terms of water quality, the instruments that were perceived the most effective were support to organic farming (41%), Natura 2000 and Water Framework Directive payments (39%) and agri-environment-climate-voluntary commitments (AECM) (37%). The CAP measures and instruments that were perceived the least efficient were mandatory practices (GAEC) without financial support (38%), support to areas with natural constraints (35%) and cooperation (33%).

93 For details on the analysis, see the reply to evaluation question 4 in the study on water.

94 See table 43 in the study on water.

Figure 20 Effectiveness of CAP instruments contributing to sustainable management of water (quality)



Source: public consultation[14]

5.1.6. Increasing efficiency in water use by agriculture

The share of irrigated areas stood at 5.9% of total UAA in 2016 (stable compared to 2013)[95]. The European Environment Agency reports that agriculture remains the sector exerting the highest pressure on renewable freshwater resources overall, being responsible for 59% of total water use in Europe in 2017 and mainly because of agriculture levels in southern Europe[96].

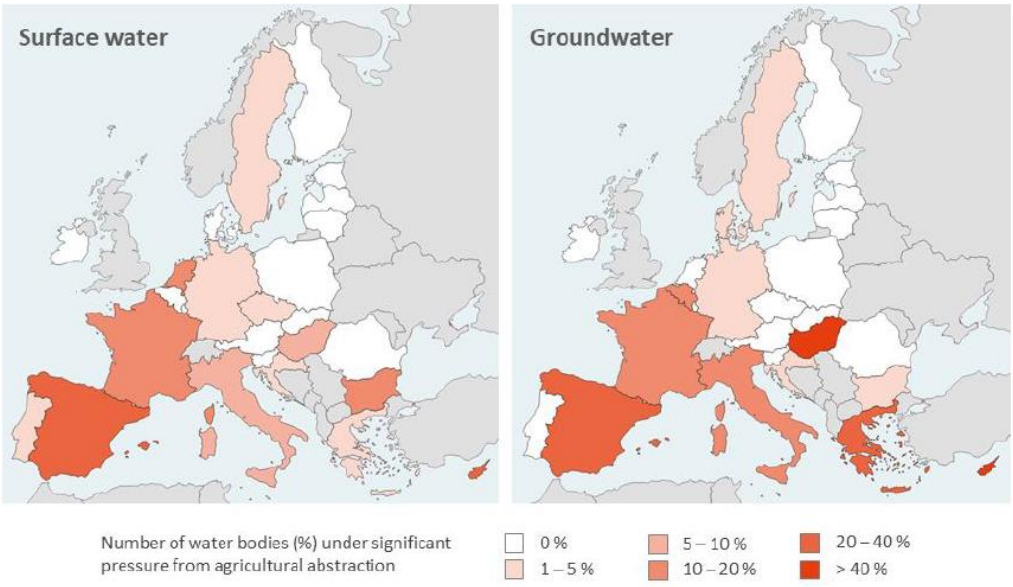
The available data on total water abstraction in agriculture does not allow for a precise estimation at the aggregate EU level. But on the basis of data from 12 Member States comparing the averages for 2010-2012/13 and 2014-2016/17, a reduction of 4% is calculated[97]. However, pressures on water quantity remain at significant pressure levels in countries like Spain, which can be seen in Figure 21.

95 CMEF indicator C.20 Irrigated land (CTX_SEC_20_2).

96 https://www.eea.europa.eu/data-and-maps/indicators/use-of-freshwater-resources-3/assessment-4.

97 CMEF indicator C.39 Water abstraction (CTX_ENV_39_1) for Bulgaria, Czechia, Denmark, Greece, Spain, Cyprus, Lithuania, Malta, Netherlands, Romania, Slovenia and Slovakia.

Figure 21. Number of water bodies under significant pressure from agricultural water abstraction



Source: European Court of Auditors

Under the focus area 5A, RDPs aim at increasing efficiency in water use by agriculture. Up to 2018, the EU-28 achieved 40.4% of the target value planned for 2023 on the share of irrigated land switching to more efficient irrigation systems.

Impact of CAP instruments and measures on water quantity

In the *summary report of the enhanced AIR* submitted in 2019 (synthesis of chapter 7)[63], only a few (of 44 reporting) managing authorities assessed the CAP contribution on the increase of efficiency in water use in agriculture. Among these, efficiency was increased in Castilla Leon and La Rioja (Spain), Hungary, Romania, etc. Numerous RDPs helped to save water in agriculture through agri-environment-climate measures, the adoption of more efficient irrigation systems, or investments to reduce losses in water infrastructure. RDP projects were reported to have helped save water in various Member States. For instance, water savings of 25% were reported in Brandenburg-Berlin (Germany), 17% in Catalonia, 18% in Castilla-Mancha and 13% in Castilla Leon (Spain) and 11% in Umbria (Italy). Other examples included Portugal-Mainland (4% water savings in areas benefiting from M04 Investments in physical assets and 9% water savings in areas benefiting from M10 AECM) and Slovenia (26% water savings).

The analysis under the *study on water*[98] found that in the river basin districts that were part of case studies, the total area irrigated increased in Poland, Italy, Austria and Spain and decreased in Croatia, Romania and France between 2012/2013 and 2015/2016. The reductions in Croatia and France occurred despite high dependency on pillar I support to farm types with water-demanding crops (especially maize), while in Romania the reason could be due to water-demanding crops replaced by drought-resistant crops[99].

Most of the CAP measures and instruments that have been assessed as efficient to improve water quality can have an effect on **water quantity** as well, when they improve

98 For details on the analysis, see the reply to evaluation question 5 in the study on water.

99 See table 54 in the study on water.

water retention in soil (e.g. reduced tillage), decrease runoff (e.g. soil cover) and enhance bank stabilisation (e.g. buffer strips). A specific water quantity issue is related to GAEC 2 on water-use authorisation and investments support (M4) granted for irrigation systems that are specific tools targeting a more efficient use of water.

However, in its Special Report on sustainable water use in agriculture[100] the European Court of Auditors considered that agricultural policies at both EU and Member State level were not consistently aligned with EU water policy. It noted that few CAP schemes linked payments to strong sustainable water use requirements, and systems for authorising water abstraction and water pricing mechanisms had many exemptions for agricultural water use[101]. The report also concluded that the CAP supports projects and practices expected to improve sustainable water use (such as water retention measures, wastewater treatment equipment) and projects improving the efficiency of irrigation systems. However, these are less common than projects likely to increase the pressure on water resources (such as new irrigation projects). The report also considered that GAECs will have no impact in Member States with weak authorisation procedures and/or controls.

The absence of data makes it impossible to draw conclusions on the indirect effect of water-relevant CAP instruments and measures regarding soil capacity to increase water retention. For case study Member States, in particular the Netherlands, Poland and Finland, GAECs 4 (soil cover) and 7 (landscape) as well as ESPGs were not effective enough to influence land uses and farming practices beneficial to the water-retention capacity of soil. On the other hand, Germany seems to have seized the opportunities provided by GAECs and greening provisions to deal with the low soil-retention capacity in the Member State[102].

The effectiveness of pillar II measures targeting focus area 5A on water abstracted for irrigation cannot be determined. But the observed increase in the water exploitation index (WEI+) indicators across all areas indicate worsening water stress situations arising from lower renewable water resources and higher water consumption. Water-relevant CAP measures generally failed to deliver effects on water abstraction, and water-demanding sectors (such as maize, vegetables, fruits and flowers) benefit from other CAP supports under both pillars.

The lack of homogeneous data (time period and scale considered) does not make it possible to establish a correlation between increased soil organic matter (associated with increased water-retention capacity) and lower water consumption in the river basin districts observed in the case studies.

In the *public consultation*, regarding the question on the effectiveness of the CAP instruments that contribute to sustainable management of water in terms of water quantity (in %), the instruments that were perceived the most effective were investment support on farms (33%), Natura 2000 and Water Framework Directive payments (33%), knowledge transfer and advice (32%) and innovation (40%). The CAP measures and

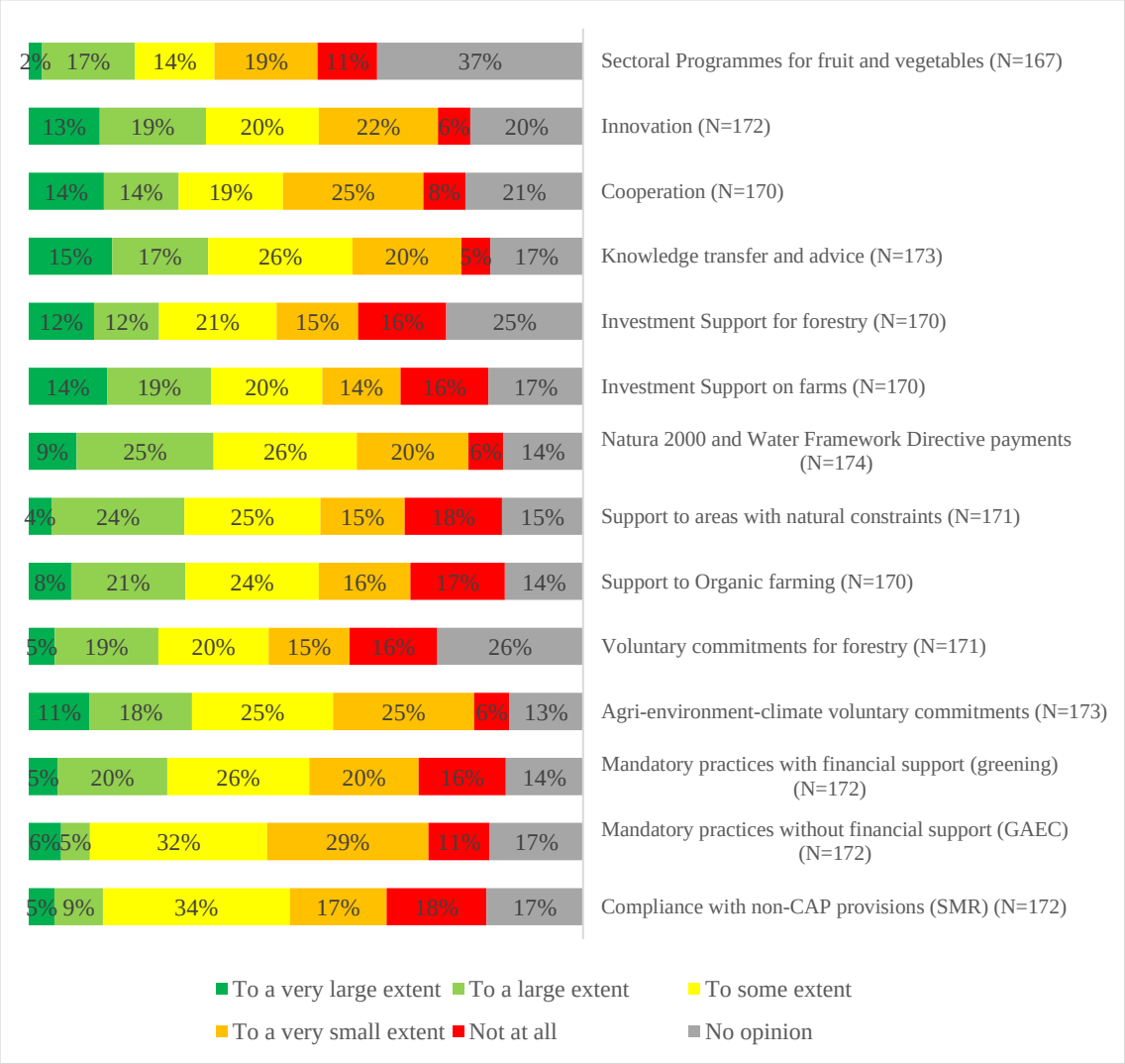
[100] European Court of Auditors' Special Report 20/2021 on sustainable water use in agriculture: CAP funds more likely to promote greater rather than more efficient water use.

[101] As described in chapters 2 and 3, the CAP contributes to the objectives of the Water Framework Directive through different instruments.

[102] See table 59 in the study on water.

instruments that were perceived as the least efficient were mandatory practices (GAEC) without financial support (35%) and linking CAP support to compliance with specific non-CAP regulatory provisions (SMR) (35%).

Figure 22 Effectiveness of CAP instruments contributing to sustainable management of water (quantity)



Source: public consultation[14]

5.2. Efficiency

The efficiency of the CAP instruments and measures addressing sustainable management of natural resources is assessed by examining whether opportunities exist to improve the ratio of costs to benefits, and by considering whether the administrative burden is proportionate to the support provided and results obtained.

The analysis is based on data analysis, case studies, theoretical reasoning and expert judgement in the three studies[103], complemented by CMEF data and findings from

[103] For details on the analysis, see the reply to evaluation questions 9 and 10 in the study on biodiversity, evaluation questions 10 and 11 in the study on soil and evaluation questions 9 and 10 in the study on water.

previous studies and evaluations, notably a dedicated study on the administrative burden of the CAP[104] and the evaluation on greening[105].

The *study on administrative burden* mentioned above estimated that for the administrations the integrated administration and control system (IACS) costs represent around 3% of the annual CAP budget[106] (3.5-3.9% of IACS managed CAP budget), which was found to be below overall European structural and investment funds. Management and controls were found to be the highest proportion of the IACS costs (74%) followed by set-up costs (14%) and running costs (12%). 10% of total IACS costs related to greening, 8% to cross-compliance and 32% to rural development. For farmers, the share of the administrative burden, excluding compliance costs, accounts for about 2% of the total aid received.

The study concluded that the 2013 reform led to an increase of the administrative burden on administrations (attributed mostly to the key novelty of the reform, i.e. the greening, e.g. establishing reference layers, acquiring and verifying the data etc.), which has helped to avoid a significant increase of the burden on the beneficiaries – the farmers' interviews indicated no significant increase in respect of administrative burden. Specifically for greening, farmers tended to associate compliance and scheme definitions as a source of burden rather than the associated administrative tasks.

The study shows significant differences between Member States covered by case studies, depending on their size, internal organisation or choices made, and also revealed that there is little data available on the administrative costs related to the CAP implementation which makes comparisons between Member States difficult and which did not allow for a monitoring of the costs over time.

The *European Court of Auditors* pointed out in their 2016 report[107] that despite their similarities, the compulsory GAEC and greening rules are checked under two control systems, which may lead to inefficiencies in the control systems and an additional administrative burden.

According to the replies to the *public consultation*, the main aspects of administrative cost/burden in the implementation of the current CAP instruments and measures to achieve the objectives relevant to sustainable management of natural resources fall on beneficiaries (61%), followed by administrations (33%) and others (6%).

For beneficiaries, the major cost/burden is the 'complexity to submit an aid application' (36%), followed by 'too much time and effort required for administrative controls' (23%), 'too much time required to receive the payment after submitting the aid

[104] Ecorys (2018) Analysis of administrative burden arising from the common agricultural policy. https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/regulation-and-simplification/analysis-administrative-burden-arising-common-agricultural-policy_en.

[105] SWD(2018)478; see footnote 15.

[106] For the budget of the CAP for 2014-2020, see: **Error! Reference source not found.**3; for the expenditure of relevant CAP measures (Greening and RDP), see Table ***14***4.

[107] European Court of Auditors (2016). Making cross-compliance more effective and achieving simplification remains challenging. https://www.eca.europa.eu/Lists/News/NEWS1610_27/SR_CROSS_COMPLIANCE_EN.pdf.

application' (21%) and 'too frequent changes in the policy' (20%), supported mostly by researchers, EU citizens and business organisations.

For administrations, the clear source of cost/burden are 'too frequent changes in the policy' (51%), followed by 'complexity of management in the administrative system' (35%) and the 'complexity due to a decentralized administrative system' (14%), supported mostly by environmental organisations and EU citizens.

Overall, most stakeholder groups perceived positively the CAP measures and instruments implemented by the Member States as they generate the best possible results on management of natural resources with its available budget. It was especially positive for public authorities, companies and business associations.

Cross-compliance

The *study on administrative burden* estimated a cost range of EUR 130-152 million for cross-compliance at the aggregate (EU) level, concluding that cross-compliance costs as a percentage of direct payments received have decreased from 2015 to 2017. As costs of controls of cross-compliance are strongly integrated in regular controls of payments, the study could not extract what share of costs is related purely to controls of SMRs and/or GAECs. However, an indicative observation shows, that additional costs of SMR controls appear to require 1.5% of a full-time equivalent per year. Costs incurred from controls of GAECs mainly arise through the risk-based sampling process, due to the relatively time-consuming process of establishing the risk profile.

The case studies conducted for the *study on soil* included interviews with the relevant authorities in Wallonia (Belgium), Bulgaria, Czechia, Greece, Spain, Italy and Sweden. According to them, the administrative management of GAECs 4-6 (soil) has a low administrative burden. Most of the administrative burden on the farmers' side emerges from controls of GAECs 4-6 (soil). As for the effects achieved, the study on soil finds that the high administrative burden for GAEC 6 (soil organic matter) is not matched by a sufficient contribution to address soil organic matter conservation. In comparison, GAEC 4 (soil cover) was assessed as effective on erosion and was associated with a smaller administrative burden.

The *study on water* finds that the administrative burden generated by water-related cross-compliance measures appears to be appropriately proportionate to the results achieved, given the effectiveness of GAECs 1-5 (water and soil) and SMRs 1 (nitrates) and 10 (plant protection products) on water quality and quantity objectives.

Replies to the *public consultation* do not provide a positive perception about the extent to which cross-compliance generates the best possible results on the management of natural resources with its available budget. For SMRs, 24% of 173 replies consider the extent to be large or very large, 31% 'to some extent', compared to 26% 'to a very small extent' and 6% 'not at all' (and 13% having no opinion). For GAECs, 16% of 169 replies consider the extent to be large or very large, 27% 'to some extent', compared to 34% 'to a very small extent' and 11% 'not at all' (and 11% having no opinion).

Greening

The *study on administrative burden* estimates a cost range of EUR 166-186 million for greening at the aggregate (EU) level, making it one of the major cost items of managing and control of direct payments.

The study finds that a majority of the Member States considers on-the-spot controls for EFA a major burden. This is linked to the increased cost of complying with control requirements and mapping EFA elements in a dedicated land-parcel identification system layer (for administrations), the correct declaration of EFA and increased farm inspections (for farmers)[108]. The study also finds that implementation choices by Member States can lead to overlaps of greening with other policies, including permanent grassland under Natura 2000, Birds Directive requirements under cross-compliance, afforested areas under pillar II, as well as regional soil and water protection measures.

The study includes an overview of farmers' perspectives on administrative burden, collected through semi-structured interviews of 122 farmers in 12 case study Member States. According to the farmers interviewed, the main compliance requirements include maintaining permanent grassland and creating ecological focus areas; i.e. compliance with rules on prohibitions of phytosanitary products and fertilisers, sowing and ploughing dates in areas declared as EFAs, in particular for catch crops. Beyond compliance requirements, the main administrative task mentioned by farmers is the measurement and declaration of areas corresponding to EFAs.

On the basis of case studies conducted for the *evaluation on greening*, private transaction costs for farmers are equivalent to 3-9 hours per year per farm and largely independent of farm size, costing between EUR 36-217 million a year. The evaluation provides an estimate of the additional public administration costs of the greening measures on the basis of a survey of 21 Member States falling between EUR 27-76 million per year at the EU-28 level. This equates to approximately 0.2-0.65% of the value of the budget dedicated to the greening payment and between 3% and 8.5% of the total public administrative cost of direct payments as a whole.

The *study on biodiversity* considers that the administrative burden of creating and maintaining a map of landscape features to support their declaration as EFA is almost certainly disproportionately high at EU level, given that landscape features accounted for only 1.7% of declared EFA in 2018 (although much higher in certain Member States) and that many of these were already protected through GAEC 7 (landscape). Case studies found some examples of disproportionate costs in Ireland (burdensome mapping activities) and Germany (declaration of eligible area).

The interviews with the relevant authorities in the case studies conducted for the *study on soil* indicate increased administrative burden linked to controls of greening measures in Sweden. As for the effects achieved, the study on soil finds that the administrative burden for crop diversification is proportionate with its contribution to addressing soil organic matter conservation and other soil quality issues.

According to the *study on water*, greening entailed few opportunity costs, except for highly specialised farms, and generated high administrative burden on the farmer side, mostly related to the understanding of and documentation for the greening rules. The study finds that greening payments are highly efficient and maintain beneficial practices for water protection.

Replies to the *public consultation* provide a balanced perception of the extent to which greening generates the best possible results for managing natural resources with its

[108] The study could not assess the administrative burden related to crop diversification and permanent grassland, as the case studies of the study did not provide sufficient data on costs.

available budget. 33% of 171 replies consider the extent to be large or very large, 24% 'to some extent', compared to 20% 'to a very small extent' and 14% 'not at all' (and 9% having no opinion, they being mainly EU citizens and business associations).

Pillar II

The *study on the administrative burden* estimates a cost range of EUR 558-626 million for IACS-based rural development measures at the aggregate (EU) level. Management and control costs are most frequently in a range between 5 and 15% of the amount of payments, but variability per Member State is much higher than this range.

The study finds that the costs of control and administration are particularly high for the agri-environmental-climate measure, due to the complexity of some types of operation and changing of eligibility requirements, the potentially numerous and different items to be checked according to the type of commitment and the specific field investigations required (late mowed, verification of fertiliser / phytosanitary inventory books and storage premises, etc.).

The studies on biodiversity, soil and water confirm the high administrative burden of **AECM**. The case studies of the *biodiversity study* demonstrated an unnecessary administrative burden common to Member States linked to the designing of options for AECMs. The *study on water* finds that targeting AECMs on relevant beneficiaries/geographical areas regarding water issues has improved its efficiency in some Member States. But in many Member States, the calculation of the payment rate of AECMs fails to cover the opportunity cost for highly productive farms, while in others (e.g. Finland, Croatia and Apulia-Italy) transaction costs are covered or limited (e.g. Netherlands).

According to the *study on soil*, AECMs are the most demanding soil-relevant measure in terms of administrative burden, but they also appear to be the most effective CAP instrument for soil protection, and therefore an efficient instrument with regard to this cost-effectiveness ratio. The information collected during the case studies show that the payment levels provided under AECMs can sometimes hinder its attractiveness, notably for highly productive farms (Wallonia (Belgium), Czechia, Bavaria (Germany), Ireland, Sweden). However, for most of the stakeholders interviewed, the payment rate of pillar II measures relevant for soil was high enough to offset opportunity costs but sometimes too low to cover the administrative costs further incurred by beneficiaries as part of transaction costs (Italy-Tuscany).

The *study on soil* also finds that payment rates under **organic farming** were generally set at an appropriate level to encourage application by farmers and that support for organic farming generates the same pattern of high administrative burden and high level of effectiveness, albeit to a lesser extent than AECMs. Among the case study Member States in the *study on water*, the support for organic farming promotes farming practices that are more remunerative in half of the case study Member States.

The *study on water* finds that **forest-environment measures and investments in forest areas** generate high administrative burden and generally fail to cover transaction costs. The latter is contradicted by the *study on soil*, according to which payment rates under forestry investments were generally set at an appropriate level.

According to the *study on water*, payment rates granted under **knowledge transfer** (M1) and **advisory services** (M2) were found to be set at an efficient level, and collective approaches (in Spain, Croatia, Austria) made it possible to support more farmers at a

lower cost. However, as also derived from the case studies under the *study on biodiversity*, the high level of administrative burden associated with knowledge and advisory measures often discouraged their implementation or uptake. This is confirmed by the evaluation support study on knowledge exchange, according to which administrative burdens for public administrations and intermediate bodies (advisory and training bodies) are significant and contributed to the delay in implementation resulting in a low uptake of measures (reaching about 10% of the EU farms and 20% of CAP beneficiaries)[109]. The situation was very similar for **cooperation** (M16).

Regarding **investments in physical assets** (M4), the *study on water* finds that the payment rate was sometimes found to be too low, and the measure generated high administrative burden according to case study interviewees (echoed by the *study on biodiversity*). The targeting of support for water quantitative management under investments in physical assets is ensured by eligibility rules for support for investments in irrigation systems and infrastructures, as set out in Article 46 of Regulation (EU) No 1305/2013. According to case studies, implementation of Article 46 generated considerable administrative burden in some Member States (notably in Italy-Apulia). However, the administrative burden can be justified in this case to ensure that the investments lead to greater efficiency for the farmer but also that they better ensure the environmental benefit to the ecosystem (with some of the water saved going back to the water body).

In its Special Report No 1/2017, the *European Court of Auditors* found that **Natura 2000** payments did not cover scheme participation costs in some Member States[110].

Overall, on the possibilities to reduce administrative burden when implementing RDP measures, the *study on water* shows possibilities, in large areas or with a large number of farmers involved, in collective actions, as was the case of the Netherlands with AECM (M10). The *study on soil* showed that Member States can reduce their own monitoring burden[111] by using satellite images to improve and facilitate controls when relevant (such as for GAEC 4 on soil cover). Lastly, the *study on biodiversity* shows that Member States can also reduce burden by not overlapping EFA options with existing GAECs, which would reduce the burden of mapping, and by reducing or modifying AECM operations whose uptake is low.

Replies to the *public consultation* confirm the generally positive perception of the extent to which pillar II measures generate the best possible results for the management of natural resources with its available budget. Organic farming (52%), AECM (46%), investment support for forestry (46%) and Natura 2000 (44%) are the measures that fare best (% replies considering the extent to be large or very large) in the eyes mostly of EU citizens, NGOs, public authorities and business associations.

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[109] ADE, CCRI and ÖIR (2020) Evaluation support study on the CAP's impact on knowledge exchange and advisory activities. Brussels. https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/research-innovation-and-technology/caps-impact-knowledge-exchange-and-advisory-activities_en.

[110] Special Report No 1/2017 – More efforts needed to implement the Natura 2000 network to its full potential, paragraphs 59-60.

[111] Area monitoring system.

Other measures

The study on soil finds that environmental measures of the fruits and vegetables support scheme under the common market organisation are set at appropriate levels to encourage application by farmers. Replies to the public consultation provide a positive perception of the extent to which the sectoral programmes for fruit and vegetables generate the best possible results on management of natural resources with its available budget. 29% of 172 replies consider the extent to be large or very large, 34% 'to some extent', compared to 15% 'to a very small extent' and 3% 'not at all' (and 19% having no opinion).

5.3. Coherence

The assessment of coherence[112] of the CAP includes the assessment of CAP instruments and measures under the general objective related to the sustainable management of natural resources and in particular biodiversity, soil quality and water (internal coherence). The assessment of coherence also includes the assessment against other related EU and national policies (external coherence). An assessment of biodiversity related instruments and measures against the other CAP general objectives is provided on the basis of the corresponding evaluation support study.

The methodology for analysing coherence is based on theoretical consistency checks, using the relevant intervention logics, previous studies and evaluations, as well as findings from case studies (biodiversity and water) and stakeholders (soil).

The analysis (from the study on biodiversity) shows an overall high level of coherence between biodiversity-related CAP instruments and measures and the other environmental objectives of the CAP (water, soil and GHG emissions).

5.3.1. Internal coherence of CAP measures and instruments in addressing sustainable management of natural resources

The internal coherence of the CAP instruments and measures to support sustainable management of biodiversity, soil and water is high and provides opportunities for mutually enforcing outcomes[113]. When combined, support for AECMs (M10), organic farming (M11), Natura 2000 (M12) and investments in physical assets (M4) is more effective; and it can be even more effective if also combined with support to knowledge transfer (M1), advisory services (M2) and cooperation (M16) and the farm advisory system. The studies on biodiversity and water also find further synergistic relationships between the measures mentioned above and forest-related measures (M8 and M15). Cross-compliance and greening measures are also producing strong coherence and contribute to the objectives of biodiversity, soil and water.

On the basis of the case studies, the *study on biodiversity* finds interactions between voluntary coupled support and/or ANC payments with greening payments, AECMs or Natura 2000 payments. Member State implementation choices of voluntary coupled support seem to lack any biodiversity-specific focus that these other measures can have

[112] Coherence is understood as how well the CAP works i) internally and ii) with other EU interventions in promoting the sustainable management of natural resources.

[113] For details on the analysis, see the reply to evaluation synthesis question 11 in the study on biodiversity, the reply to evaluation question 13 in the study on soil and the reply to evaluation question 12 in the study on water.

(e.g. stocking densities). Only two clear issues of incoherence that were found for achieving the CAP's biodiversity objectives related to certain exemptions.

Farmers of permanent crops in receipt of direct payments are not subject to relevant greening practices but are subject to cross-compliance and receive support. Farmers under the Small Farmers Scheme (SFS) are exempted from both cross-compliance and greening requirements. That does not imply that farmers do not implement environmental measures; should they apply for measures from pillar II and likewise, the statutory management requirements part of cross-compliance also remain applicable. These exemptions reduce the overall agricultural area subject to cross-compliance and greening requirements, which nonetheless remain substantial (84% and 79% of UAA respectively in 2019).

The *study on soil* finds significant synergies between SMR 1 (nitrates) and EFA, inducing farmers to implement cover crops. Nevertheless, the benefits arising from declared EFAs are limited where they overlap with SMR 1 compliant areas. This can generate a deadweight, which Member States can act to limit or avoid through additional restrictions (such is the case of the Netherlands, where catch crops required under SMR 1 cannot be declared as EFAs)[114]. The additional benefits from EFA in such cases where Member States do not act to counter the deadweight are therefore limited compared to the environmental baseline already set by cross-compliance.

With respect to CAP instruments and measures not targeting sustainable soil management, certain eligibility rules linked to decoupled direct payments indirectly hinder the establishment or maintenance of landscape elements and forests, because excluding areas from decoupled payment excludes the related greening obligations. By contrast, decoupled direct payments are granted on drained peatlands, which provides an incentive for farmers to avoid restoring peatlands, despite the significant environmental benefits of their restoration.

Voluntary coupled support can foster nitrogen-fixing crops (increasing soil structure and nutrient balance) and help maintain grasslands. But on the other hand, intensive animal-based production can be harmful for soils if grazing and manure/slurry use are not properly managed. The study on soil also considers that the contribution of payments to areas with natural constraints to the maintenance of grassland hinders the alternative of land abandonment, which may produce spontaneous reforestation or afforestation, producing a positive effect for soil protection, as soil erosion risks diminish. However, evidence of the effect of land abandonment is rather pointing to the contrary[115].

The *study on water* highlights that only a few pillar II measures specifically address water issues. In addition, sectors with the highest impact on water quality and quantity (e.g., flowers, wine[116]) are not constrained by the CAP framework[117] in some Member

[114] European Court of Auditors, Special Report No 21/2017 (Greening).

[115] For example, see *The challenge of land abandonment after 2020 and options for mitigating measures*, European Parliament Agri Committee, 2020, Agnoletti et al., 2019, Rodrigo-Comino et al., 2018; Agnoletti et al., *Terraced Landscapes and Hydrogeological Risk. Effects of Land Abandonment in Cinque Terre (Italy) during Severe Rainfall Events* (2019); Rodrigo-Comino et al., *Contrasted Impact of Land Abandonment on Soil Erosion in Mediterranean Agriculture Fields* (2018).

[116] This does not apply to the fruit and vegetable common market organisation, as the environmental framework can support operations for better water management, and more specifically the programme provides support to investments in irrigation under specific conditions and based on the eligibility criteria established by the Member State.

States. Some inconsistencies with regards to the increase of water efficiency use arise, as it is possible to provide direct payments to highly irrigated crop types (i.e., maize,) as long as they respect the cross-compliance rules. This situation therefore makes it difficult to guarantee that funding for irrigation projects will not aggravate the pressure on water quantity[118], especially if water is scarce. There are also minor issues preventing farmers from participating in measures beneficial for water (i.e., it would be environmentally beneficial to implement a flood attenuation measure, allowing water to pool on agricultural land, but such practice would make the land non-eligible for direct payments, so farmers will not implement it).

Overall, restoration practices of more natural morphology or riverbanks would lead to a reduction of the land eligible for direct payments, hindering its possibility of implementation.

It is worth noting that the *evaluation on greening* found greening measures to be generally consistent with other measures addressing the sustainable management of natural resources, particularly cross-compliance and the agri-environment-climate measure. However, more could be done to make these work together in a synergistic way. The evaluation highlighted an issue between the way that the Member States apply the CAP eligibility rules and the way they define permanent grassland.

A significant share of the respondents to the *public consultation* consider that the CAP instruments and measures which contribute to the sustainable management of natural resources are coherent, but to varying extents. 59% of respondents (out of 170 replies to the question) consider CAP measures and instruments to be coherent with one another in addressing the sustainable-management-of-natural-resource objective, with 2% 'to a very large extent', 17% 'to a large extent' and 40% 'to some extent'. 21% replied 'coherent to a very small extent', while 'not at all coherent' was chosen by 16%.

The majority of replies from NGOs and environmental organisation expressed criticism, and over 40% of citizens also consider that the CAP measures and instruments are incoherent, or coherent to a very small extent. A recurring criticism concerns the perceived implementation deficit (whether measures are enforced) and the lower ambition of Member States due to greening.

[117] Following the 2003 reform and the decoupling of CAP support, in Member States implementing the historical model, specific agricultural sectors (e.g. fruits and vegetables, wine) did not benefit from direct payments entitlements. When they were excluded from direct payments, those sectors were consequently not forced to comply with GAEC and SMR rules.

[118] European Court of Auditors, Sustainable use of water in agriculture (Audit preview).

Table 7 Internal Coherence of CAP measures and instruments in addressing sustainable management of each of the natural resources

	Biodiversity	Soil	Water quantity	Water quality
Farms advisory system (FAS)				
GAEC 1 (buffer strips)				
GAEC 2 (irrigation)				
GAEC 3 (groundwater)				
GAEC 4 (soil cover)				
GAEC 5 (land management)				
GAEC 6 (soil organic matter)				
GAEC 7 (landscape)				
SMR 1 (nitrates)				
SMR 2 (wild birds)				
SMR 3 (habitats)				
SMR 10 (plant protection products)				
Basic/Single area payment schemes				
Crop diversification			See footnote[119]	
Permanent grassland				
Environmentally sensitive permanent grassland (ESPG)				See footnote[120]
Ecological focus area (EFA)				
Voluntary coupled support				
Small farmers scheme				
Knowledge transfer and information actions (M1)				
Advisory services (M2)				
Investments in physical assets (M4)				
Basic services and village renewal in rural areas (M7)				
Investments in forest areas (M8)				
Agri-environment-climate measures - AECMs (M10)				
Organic farming (M11)				
Natura 2000 & Water Framework Directive (M12)				
Payments to areas facing natural or other specific constraints – ANC (M13)				
Forest-environment (M15)				
Cooperation (M16)				

Legend: Green – coherent and synergistic; Blue – coherent but very limited synergy;
Yellow - limited/mixed coherence; Red - incoherent

Source: Directorate-General for Agriculture and Rural Development

5.3.2. External coherence of CAP measures and instruments in addressing the sustainable management of natural resources

The external coherence of the CAP instruments and measures in addressing the sustainable management of biodiversity, soil and water varies depending on the objective

[119] Some issues in a single case study country (France), as the certification scheme implemented in France for single-crop maize growers can be detrimental to water, allowing farmers to continue maize monocropping, which results in higher rates of water abstraction and a concentration of fertilisers/pesticides.

[120] See previous footnote.

(external to the CAP) and is influenced by the implementation choices of Member States[121].

Overall, cross-compliance provides for a high level of coherence, as SMRs introduce mandatory conditionality on the basis of relevant non-CAP legislation. A possible risk of partial coherence or incoherence of pillar II measures derives from the flexibility of national choices regarding their objectives, design and environmental conditions. The studies on biodiversity, soil and water share an assessment of strong coherence of the AECMs (M10) and organic farming (M11) with the relevant EU objectives on natural resources.

The *study on biodiversity* finds that most of the CAP instruments and measures are theoretically coherent with other related EU and national policies relevant for biodiversity. In addition to the pillar II measures mentioned above, these include the designation of ESPG, Natura 2000 and forest measures, i.e. measures with the highest potential impacts on biodiversity[122]. However, the case studies found that a very limited ESPG designation occurred outside Natura 2000 areas, despite the protection of semi-natural grasslands outside the Natura 2000 network being a non-mandatory requirement in all Member States. In some Member States (e.g. Hungary and Latvia) there are cases where the application of pillar II measures has the potential to be incoherent with biodiversity needs, as they could lead to damaging agricultural improvements (expansion or irrigation) or inappropriate afforestation. Examples of the latter could include biodiversity safeguard criteria derogations to allow non-native trees to be planted in forest areas (Latvia).

The study on biodiversity also identifies relevant objectives of EU instruments that are affected by the CAP and have a significant role to play in supporting EU biodiversity objectives: the National Emissions Ceiling Directive (Directive (EU) 2016/2284) on limiting ammonia emissions, the Nitrates Directive (91/676/EC) reducing water pollution, the Water Framework Directive (2000/60/EC) on protecting, enhancing and restoring all water bodies, and Directive (2009/128/EC) establishing a framework for Community action to achieve the sustainable use of pesticides. The case studies did not find evidence of a wide use of integrated approaches that combine funding from CAP and other sources, with exceptions in Germany and Latvia, where the implementation of AECMs is supported using LIFE[123] and cohesion funding.

The *study on soil* shows that most of the relevant CAP instruments and measures are theoretically and practically coherent with the soil-related objectives of EU environmental and climate-change policies[124]. However, the lack of a legally binding EU framework for soil means that the coherence and complementarity of CAP actions and EU environmental and climate legislation with respect to soils remains highly dependent

[121] For details on the analysis, see the reply to evaluation synthesis question 13 in the study on biodiversity, the reply to evaluation question 14 in the study on soil and the reply to evaluation question 13 in the study on water.

[122] Annex 7: Tables and figures complementing chapter 5 provides an overview of the theoretical assessment of the coherence of CAP measures with the Birds and Habitats Directives and actions under target 3 of the EU biodiversity strategy.

[123] The LIFE programme is the EU's funding instrument for the environment and climate action. https://ec.europa.eu/easme/en/life.

[124] Annex 7: Tables and figures complementing chapter 5 provides an overview of the coherence of CAP instruments and measures with the EU soil-related objectives.

on managing authorities' implementation choices. Implementation choices also determine the synergies with soil-related objectives of EU policies (e.g. application of rotation, the type of crops, when they are grown, etc.). Evidence from the case studies suggest that soil-related issues were not a major influencing factor in farmers' crop diversification choices (e.g. Belgium-Wallonia, Czechia, Denmark, Greece, Italy). The study on soil also shows instances where mixed/conflicting outcomes occur as a result of Member States' implementation choices, e.g. investment support is used to purchase specialised equipment that can improve soil quality by reducing the use of inputs or improving efficiency (e.g. Belgium-Wallonia, Spain-Aragon, Ireland, Italy-Tuscany). But certain tilling and heavy spreading equipment can have negative effects in terms of damaging soil structure and compaction (e.g. Belgium-Wallonia, Ireland, Italy-Tuscany).

The *study on water* identifies a partial coherence of the CAP instruments and measures dedicated to environment with the general objective of the EU environmental legislation and strategy (Water Framework Directive, Nitrates Directive, Sustainable use of pesticides Directive, etc.)[125]. The study emphasises the CAP's role as important in promoting the objectives of the Water Framework Directive and points to the contribution of investment measures (M4) in helping farmers to reduce water consumption for irrigation. The contribution of greening practices was targeted on Climate Change and Biodiversity. The study on water also points to instances of incoherence:

- limited number of pillar II measures specifically addressing water issues implemented by managing authorities;
- sectors with highest impact on water quality and quantity (e.g. fruits, flowers, wine) are not constrained by the CAP framework;
- inconsistencies with trade agreements allowing duty free imports of oilseeds, oilseed products and non-grain feed ingredients that incentivise animal feed imports and thereby promote the creation of concentrated and intensive animal husbandry farms around big ports, leading to a specialisation of regions, producing a structural pollution of waters scenario – while the study does not substantiate this effect, the Trade Sustainability Impact Assessment of the EU-Canada Comprehensive Economic and Trade Agreement[126] considers that the expansion in the dairy sector, as a result of trade deals, could worsen the impact on water quality from this sector.

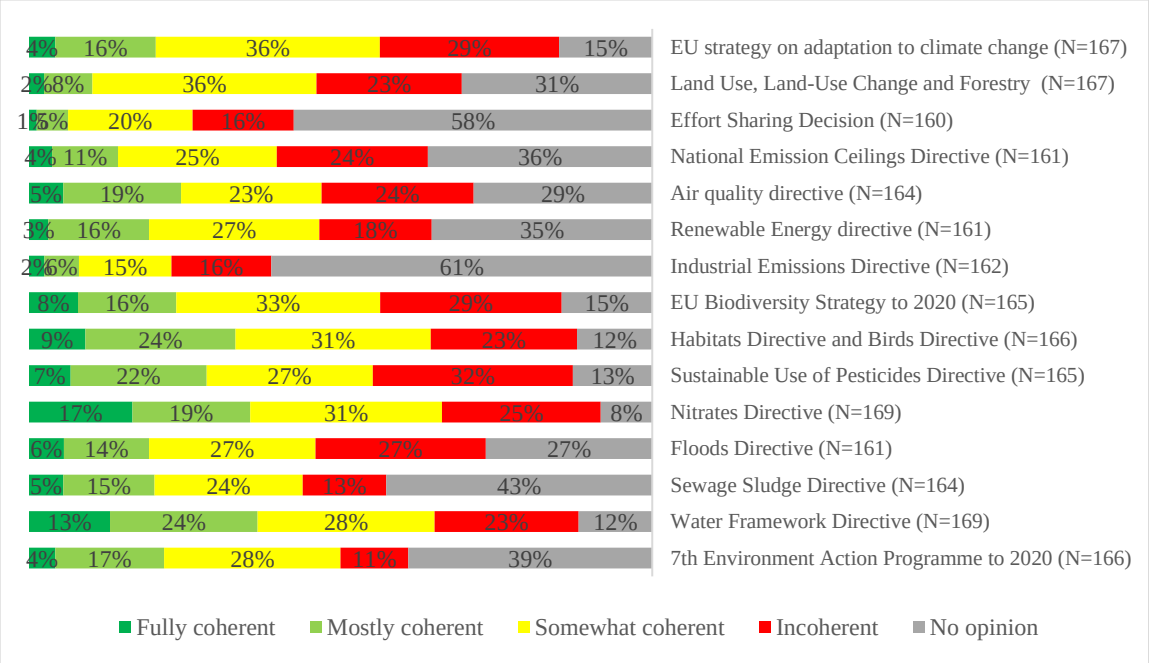
Replies to the *public consultation* do not provide a clear and conclusive picture on the extent to which the applicable CAP instruments and measures addressing sustainable management of natural resources deliver a coherent and complementary contribution with overall EU environmental and climate change legislation and strategies.

The highest share of positive replies (sum of 'fully coherent' and 'mostly coherent') concern coherence with the Water Framework Directive (37%), the Nitrates Directive (36%) and the Habitats Directive (33%). Although the coherence with the Sustainable Use of Pesticides Directive received the fourth highest share of positive replies (29%), it attracted the highest share of negative replies (32%).

[125] Annex 7: Tables and figures complementing chapter 5 summarises the coherence of CAP instruments and measures with the key EU key water and environmental policies and strategies.

[126] Commissioned by the European Commission's Directorate-General for Trade, carried by Development Solutions Europe Limited.

Figure 23 Coherence with overall EU environmental and climate change legislation and strategies



Source: public consultation[14]

A large share of respondents perceive incoherence with the EU biodiversity strategy to 2020 (29%) and the EU strategy on adaptation to climate change (29%). As in the replies on internal coherence, NGOs and environmental organisation are most critical, along with a considerable share of citizens. On the coherence with the EU biodiversity strategy to 2020, 68% of NGOs and environmental organisations and approximately 40% of citizens replied 'incoherent', while 53% of public authorities gave a positive reply (without a single negative reply).

5.3.3. Internal coherence of CAP measures and instruments addressing sustainable management of natural resources with other CAP objectives

The *study on biodiversity* assessed the coherence of instruments and measures related to biodiversity with the objectives of viable food production and balanced territorial development[127].

In theory, biodiversity instruments and measures could constrain farm operations through conditionality and increased costs, and thereby lead to incoherence with the viable food objective. However, the study shows that this rarely occurs in practice. The EFA obligation had little negative impact on agricultural income and productivity, because Member States and farmers have used the flexibility offered in the legislation to make EFA choices in order to avoid conflicts with the objectives of income and competitiveness. The greening crop diversification measure also had an overall limited impact on production.

[127] For details on the analysis, see the reply to evaluation question 12 in the study on biodiversity.

Table 8 Coherence of the CAP's biodiversity measures with its general objectives

	Viable food production (agricultural income, agricultural productivity, price stability)	Balanced territorial development (rural employment, rural growth, poverty in rural areas)	Sustainable use of natural resources and climate action (greenhouse gas emissions, water and soils)
Horizontal measures - Regulation (EU) No 1306/2013			
FAS			
SMR 2 (wild birds)			
SMR 3 (habitats)			
GAEC 7 (landscape)			
Pillar 1 - Regulation (EU) No 1307/2013			
Crop diversification			
Permanent grassland			
Environmentally sensitive permanent grassland (ESPG)			
Ecological focus areas (EFA)			
Pillar 2 - Regulation (EU) No 1305/2013			
M4.4 Non-productive investments			
M8.5 Investments for the resilience and environmental value of forest ecosystems			
M10 Agri-environment-climate			
M11 Organic farming			
M12.1 and M12.2 Natura 2000 payments			
M15 Forest-environmental and climate services and conservation			

Source: support study on biodiversity
Legend:
'+1' (green) synergistic;
'0' (blue): coherent or neutral relationship;
'-1' (red): incoherent;
'-' (white): inconclusive assessment

As pillar II measures are designed to compensate farmers for lost income and additional costs incurred when enrolling in the schemes relevant for biodiversity, they should have limited or no impact on farmers' incomes. Some of these measures have also shown to deliver synergies with the objective of balanced territorial development, such as adding value to products or tourism, namely M8.5[128]. AECMs, organic farming and forestry-environment-climate measures may also indirectly support the maintenance or creation of new rural businesses, thereby supporting territorial development.

The *evaluation on greening* found that greening measures are consistent with the wider CAP objectives of viable food production and balanced territorial development. Regarding viable food production, there is a positive/synergistic relationship between

[128] Slovakia and Germany, in their M8.5 investments for forest ecosystems operations, included the creation of a tourism infrastructure, increasing the recreational value of the forest, but also benefiting rural growth and employment under the balanced territorial development objective of the CAP.

crop diversification, permanent grassland, ESPG and EFA and the objectives on market stability, competitiveness and enhanced income. However, the evaluation found a risk of contradiction between permanent grassland and the objectives on market stability, competitiveness and enhanced income, where strict application of a ratio at regional level using authorisations impedes farmers' economic room for manoeuvre.

Regarding balanced territorial development, there is a positive/synergistic relationship between permanent grassland and ESPG and the objectives on socioeconomic development. But there is the same risk of contradiction between permanent grassland and the objective, where strict application of a ratio at regional level using authorisations impedes farmers' economic room for manoeuvre. Crop diversification and EFA were found to be neutral.

5.4. Relevance

The extent to which CAP instruments and measures address current needs and/or new or emerging issues facing biodiversity, soil and water is addressed by comparing the priorities and needs with the objectives of the CAP. The assessment is made at the level of the EU, Member States and farms (the latter for soil and water) and is based on replies to evaluation questions regarding effectiveness, literature review, information on Member States from case studies, causal analysis (on soil), interviews conducted (with case study experts) as part of support studies[129] and complemented with replies to the public consultation and the 2020 Eurobarometer survey on Europeans, Agriculture and the CAP[130].

The objective to address the sustainable management of natural resources remains highly relevant, as demonstrated in the state of the various environmental indicators assessed in earlier chapters. Addressing environmental (and climate) challenges is the cornerstone of the European Green Deal and its specific strategies on biodiversity and on farm to fork[131].

The overall relevance of the CAP with respect to environmental concerns is confirmed in the most recent *Eurobarometer survey*. The survey shows that environmental concerns, including the protection of natural resources and enhancing biodiversity, have become an increasingly important priority for citizens. Over half of respondents believed that protecting the environment and tackling climate change (52%) should be the CAP's main priority. Roughly 7 in 10 Europeans believe that the CAP is contributing to the sustainable management of natural resources (70%) and the fight against climate change (69%). A large majority of respondents (92%) were in favour of the EU continuing to provide subsidy payments to farmers who carry out agricultural practices beneficial to the climate and the environment.

An overwhelming majority of respondents to the *public consultation* consider that the available CAP instruments and measures are very or only somewhat relevant to respond to the actual needs of sustainable management of biodiversity (75% of replies), soil

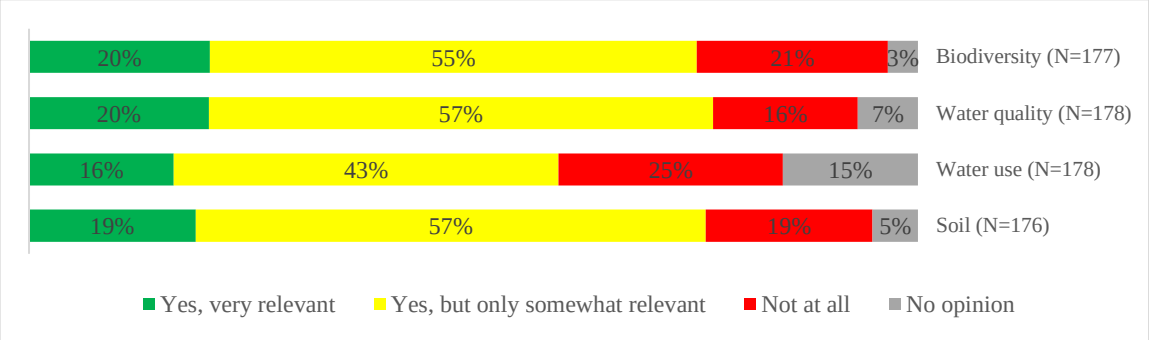
[129] For details on the analysis, see the reply to evaluation question 14 in the study on biodiversity, evaluation question 12 in the study on soil and evaluation question 11 in the study on water.

[130] Special Eurobarometer 504: Europeans, Agriculture and the CAP, carried out in the 27 Member States of the European Union between 3 August and 15 September 2020 among 27 237 European citizens https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cap-glance/eurobarometer_en.

[131] See footnotes 4 to 5.

(76%) and water quality (77%), but water quantity attracted a lower rate of positive replies (59%). The respondents who consider the CAP instruments and measures very relevant is lower, between 16-20% per resource (Figure 24). At stakeholder level, business associations found the CAP instruments and measures the most relevant and EU citizens found them the least relevant. The other groups do not show a difference strong enough between choices or do not have a sufficient number of respondents to draw conclusions.

Figure 24 Relevance of the available CAP instruments and measures



Source: public consultation[14]

On the basis of the causal analyses and assessments of effectiveness, the *studies on biodiversity, soil and water* find that at the EU level, the available range of CAP instruments and measures are suitable to address to a high degree the needs related to biodiversity. But the studies point to gaps in the CAP implementation concerning soil compaction, soil biodiversity, soil salinisation[132] and pesticide residues in soil, which are addressed by very few instruments or none at all.

Indeed, the studies highlight that the implementation choices by Member States, notably on **cross-compliance and greening** (that are highly relevant in addressing sustainable management issues), play an important role in the actual relevance of specific CAP instruments and measures with respect to the sustainable management of natural resources. However, the *study on water* identified examples (Poland and Germany) where the needs not addressed by the CAP implementation choice of the Member State were covered by State aids.

The *study on biodiversity* assesses the relevance of CAP measures in addressing the pressures and threats facing biodiversity through their contribution to maintain and restore semi-natural agricultural and forest habitats and landscapes. Accordingly, while ESPG is very relevant for addressing sustainable resource objectives, it does not protect semi-natural grasslands from all potential pressures, such as increases in the use of fertiliser or drainage (artificial drainage in Netherlands and Poland). In a similar vein, while EFA measures are relevant, the majority of the EFA area is dominated by catch crops and nitrogen-fixing crops of low relevance to biodiversity. This shows that where flexibility has been given to managing authorities in the implementation of EFA measures, there has been a trend towards adopting practises with little environmental benefit. The relevance of pillar II measures is heightened if they are targeted towards

[132] Due to soil salinisation measuring intrinsic issues (varies in time and space), literature is not clear in the number of ha affected. But it ranges between 30 million ha to more than 70 million ha affected, mainly across Mediterranean countries and the Netherlands (Soil Salinisation final report, EIP-AGRI focus group, 2020).

Natura 2000 sites. In view of their effectiveness, AECMs (M10), Natura 2000 (M12), forest investments (M8), forest-environment (M15) all help to maintain high nature value farmland and provide tailored interventions that respond to the needs of threatened high priority habitats and species.

Overall, AECM (M10) and non-productive investments (M4) are the most relevant measures because of their ability to provide tailored interventions that can maintain and restore semi-natural elements in the landscape, other important habitat features and apply relevant farm management practices, also regarding soil-related issues. Some particular actions supported under basic services and village renewal in rural areas (M7) may have an indirect effect on biodiversity. Non-productive investments (M4) are relevant in addressing biodiversity, water and other environmental objectives together with forestry measures (M8), which are used to develop Natura 2000 site management plans.

Furthermore, rural development measures (AECMs especially) are also very relevant in supporting the change from intensive farming systems to reduce fertiliser and pesticide inputs or retain or restore important in-field habitats (e.g. fallow lands) along with other landscape features (natural habitats or hedgerows, among others). The level of CAP support is not always sufficient to encourage more farmers into less intensive farming methods, and a lack of knowledge/expertise can be an additional bottleneck (see 5.1.).

Support to **organic farming** (M11) is relevant for biodiversity and soil issues but depends on the various practices that are carried out and their context. Replies to the public consultation on the organic action plan indicate a strong perception of the relevance of organic farming to the sustainable management of natural resources, with a strong majority of respondents agreeing that organic farming is beneficial to biodiversity (92%), the protection of the soil quality (88%), water quality (84%) and the responsible use of natural resources such as water (81%)[133].

The studies also find that the CAP measures on knowledge transfer (M1), advisory services (M2) and cooperation (M16) can achieve significant effects by helping raise farmers' awareness of the sustainable management of natural resources.

The *study on biodiversity* also finds ANC to be relevant for the maintenance of semi-natural habitats, just as it finds the basic/single area payment schemes and voluntary coupled support to be relevant in some circumstances (for example, in the Netherlands where it is supporting required livestock grazing in dunes, heaths and saltmarshes). Nevertheless, their relevance (ANC, voluntary coupled support, BPS/SAPS) is less, as they do not necessarily have environmental conditions that protect the habitat from damaging agricultural and forest activities (as cross-compliance requirements are not sufficient to achieve this).

The *mid-term review of the Biodiversity Strategy* concluded that the CAP design is fit for its objectives: the CAP reform for 2014-2020 provides a range of instruments that can help to support biodiversity.

[133] Public Consultation on the Action Plan for the development of the organic sector, conducted between 4 September 2020 and 27 November 2020, with 841 replies received. https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12555-Organic-farming-action-plan-for-the-development-of-EU-org/public-consultation.

5.5. EU Added Value

The extent to which the CAP instruments and measures provided added value for biodiversity and landscapes, soil quality and water, as compared to national and/or regional support from Member States was assessed against a hypothetical counterfactual without EU-funded direct payments and no EU co-financed rural development measures. The assessment was based on qualitative analysis, including a review of the presence or absence of EU and national regulations, of non-CAP related measures and strategies, a review of operations taken outside the framework of the CAP in EU and non-EU countries, stakeholder interviews in case study Member States (managing authorities, farm advisors, farmer representatives, experts) and literature review.

Given the commonality of findings on EU added value for biodiversity, soil and water, the assessment is structured according to the results of the analysis combining analysis from the three evaluation support studies and the replies to relevant evaluation questions in these studies[134].

General considerations

Economic drivers such as improving the competitiveness of agriculture, and/or maintaining the viability of farming in remote rural areas, as well as financial and administrative simplification were strong drivers of implementation choices by Member States. By contrast, the counterfactual scenario depicts a lower ambition by Member States to use agricultural support for delivering biodiversity ambitions in the absence of the CAP. However, as national and EU-funded projects are often linked via integrated approaches, it is difficult to make a strict comparison between the effectiveness and efficiency of national projects and similar CAP-supported projects[135]. National initiatives are sometimes coordinated with the CAP to support larger scale projects requiring significant financial capacities, while smaller scale projects may be supported locally to lower administrative burden.

Broad findings

On the basis of the assessment of effectiveness, the evaluation shows that certain CAP instruments and measures have provided added value at EU level in terms of the scale of benefits compared to what individual Member States might have done in the absence of the CAP and equivalent obligations. The evaluation found that:

- Cross-compliance sets a baseline for protection of biodiversity, soil and water, on 84% of EU utilised agriculture area (UAA).
- The EFA measure and, to a more limited extent, the crop diversification measure helped stem the decline of fallow in many Member States and stimulated increases in others.
- The AECM (M10) helped to reduce the intensity of management on crop and arable land and to maintain extensive pastoral systems and landscape features.
- Several other pillar II measures are making significant contributions to the conservation of biodiversity and landscapes, especially in high nature value farming

[134] Biodiversity study question 15, soil study question 15 and water study question 14.

[135] National initiatives are sometimes coordinated with the CAP to support larger scale projects requiring significant financial capacities, while smaller scale projects may be supported locally to lower administrative burden. For examples, see table 32 in the support study on soil.

areas and other semi-natural habitats, but it is not possible to reliably estimate their net combined impact.

- Among other things, the pillar II measures promoted improved management of fertilisers and pesticides (Priority 4 to restore and preserve ecosystems related to agriculture) and increased efficiency in water use by agriculture (Priority 5 on promoting resource efficiency).
- The 'soft' measures (M1, M2, M16) provide significant added value to support integrated approaches based on farmers' training.

A significant share of respondents (46% of 183 replies) to the public consultation found that the relevant applicable CAP instruments and measures create EU added value 'to a large extent' (37%) or 'to a very large extent' (9%) with respect to the sustainable management of natural resources. On the other hand, 31% of the respondents answered that there is EU added value 'to some extent', 13% 'to a very small extent' and 6% responded 'not at all'. The remaining 4% did not have an opinion.

Joint management of transboundary resources creating legal certainty and level playing field

Increased effectiveness at EU level could occur where CAP measures have supported transboundary action, for example where AECM schemes are linked to Member State implementation of other EU policies, for example through conversion of arable to permanent grassland or afforestation in 'shared' catchments, or action on migratory species.

As water requires transboundary management, joint actions are necessary to ensure a certain consistency (e.g. to avoid water pollution from a Member State located upstream which would impact a Member State located downstream). As a whole, the opinions of the stakeholders in the case studies agree that common action is relevant to address water issues on a broader scale, and especially in the case of cross-border catchments (e.g. the Rhine in France and the Netherlands, the Danube in Austria, Croatia, Romania, etc.).

Setting up common objectives and a common legal framework (e.g. on water status) ensures fairness between Member States and is relevant in tackling environmental (including water) objectives. Case study interviews confirmed the importance of joint action at EU level to ensure a common objective and framework on environmental issues, including water protection. The CAP makes for a level playing field and prevents any competition across the Member States that may lead to a race to the bottom for environmental actions. Member States have the choice of increasing their environmental ambitions through their implementation choices.

Higher level of ambition for the management of natural resources

The strong focus of Member State implementation choices to address economic objectives implies that in the absence of the CAP, Member States' underlying ambition to use agricultural support payments to deliver **biodiversity** ambitions could be quite low. From the literature review, from the findings of previous analysis and from case study interviews, it appears that the EU framework brought, to some extent, a certain added value to the process of tackling **water** issues via agriculture at the EU level. According to the literature reviewed, the management of agricultural **soils** in the EU Member States remains mainly influenced by the CAP and its implementation by the

Member States. Indeed, few Member States have a comprehensive national soil policy[136], and sustainable soil management appears to be in most cases an outcome derived from policies focusing on other environmental issues (water, biodiversity, peatlands, etc.). Thus, in most Member States, the CAP provides EU added value by increasing the level of ambition for biodiversity and sustainable soil management, by raising awareness on water issues and by providing the corresponding means for action (budget and measures).

The Member States' choices of rural development programmes reveal the general low level of ambition of local authorities to tackle issues related to **soil quality**. Moreover, results from an online survey of European soil experts and practitioners concluded that, without some key EU policies including the CAP, the ambition for soil management would be weaker among the 13 Member States studied (Frelih-Larsen et al., 2017). Interviews in the case study areas confirm this opinion as predominant in 6 out of the 10 case studies (Belgium-Wallonia, Bulgaria, Czechia, Greece, Spain-Aragon, Italy-Tuscany). On the contrary, the general opinion from Denmark, Ireland and Sweden is that the level of ambition would be the same. This hypothetical status quo is based on the fact that actions are already taken outside the framework of the CAP (e.g. Denmark protects its aquatic environment against nitrates; Swedish national regulations were already promoting catch crops and practices preventing phosphorus leaching).

In some Member States (e.g. Germany, Spain, Croatia, Italy, Poland, Romania and Finland), the CAP framework has stimulated a higher level of requirements and/or budget for **water** and environmental issues than would have been done nationally (e.g. by fostering the development of advisory services in Romania, strengthening the level of verifying compulsory measures, supporting changes of practices, etc.).

Minimum level of financial support

The funding rules for the CAP have required Member States to use 30% of their direct payment allocation for pillar 1 greening measures and 30% of their EAFRD budget for specific environmental and climate measures. EAFRD funding also provided opportunities for synergy between EAFRD and other EU funds, notably the LIFE programme[106]. These elements, together with the compulsory use of AECM have led to higher financial allocations for addressing biodiversity, soil and water objectives than would be the case in the absence of the CAP.

It was confirmed by the representatives of local authorities interviewed (Bulgaria, Czechia, Greece, Spain-Aragon, Italy-Tuscany) that the budget allocated to tackle soil issues, in areas where reduced ambition was planned, would have been lower in the absence of the CAP. This was also the case in Germany-Bavaria and Sweden: though significant ambitions for soil protection were set at the local level, the CAP framework enforced the allocation of financial means to encourage the implementation of sustainable practices.

[136] Few Member States have an overarching soil protection policy (e.g. the Soil Act in Bulgaria at national level or the Bavarian Soil Protection Act at regional level). Likewise, not all soil threats are addressed with the same level of requirements and, when addressed, sustainable soil management appears to be in most cases an outcome derived from policies and legislation focusing on other environmental issues (water, biodiversity, peatlands, desertification, etc.). In addition, national strategies directly targeting soil issues are not always allocated the means for concrete intervention (e.g. according to a researcher in Spain, the Spanish national programme to combat desertification dating back to 2008 has not been allocated a budget for actions).

Knowledge sharing

EU-level knowledge-sharing such as that through the European Network for Regional Development Contact Point and EIP-AGRI has also added value to what Member States could have achieved at national level. Arrangements to share knowledge at EU level, for example through the ENRD Contact Point and the EIP-AGRI also have the potential to improve the effectiveness of rural development programme actions to a greater extent than would be the case were Member States to make their own arrangements.

Coordination within or between regions and Member States for soil issues, through CAP measures and instruments (including knowledge sharing), remains limited. The absence of a legally binding framework that clearly determines soil threats and monitoring indicators is an obstacle to better coordination and gains in effectiveness[137]. So far, the CAP has enabled gains in technical cooperation among European stakeholders (e.g. farmers, scientists, etc.) on specific soil issues through research programmes for instance. But no case study has underlined an effect on cooperation between government and regions. However, EU-funded projects via LIFE and Horizon 2020, such as Re-Care or Soilcare, have helped to improve exchanges between Member States (Denmark, Greece).

According to interviewees in the case study Member States, the EU level brought additional added value by ensuring coherence between the CAP and the Water Framework Directive objectives and, to a certain extent, by promoting exchanges between Member States on water (e.g. through EIP projects and ENRD). This latter aspect could probably be improved, and the CAP could promote more interaction and knowledge transfer between Member States.

6. CONCLUSIONS

The purpose of this evaluation was to assess the impact of relevant CAP instruments and measures on biodiversity, soil and water and the extent to which the policy instruments of the 2014-2020 CAP have helped achieve the general objective of sustainably managing natural resources[138]. The measures covered by the evaluation study are the relevant instruments set out in the basic regulations of the 2014-2020 CAP, i.e. the Regulations on Direct Payments, Rural Development, the Common Market Organisation, and the Horizontal Regulation[139]. The geographical scope is the EU-28, including the UK.

The evaluation is primarily based on the external support studies on biodiversity[140], soil[141] and water[142] and the responses to the corresponding public consultation[143], which are

[137] According to recent studies, one of the main obstacles to coordination among authorities in Member States is the lack of an explicit definition of soil and soil threats (Paleari, 2017; Ronchi et al., 2019). Without a common definition of soil-related terms established at EU level, there is a risk of inconsistent implementation of EU soil provisions across the EU. This current situation motivated Member States to act independently, adopting and implementing sectoral policies and strategies.

[138] Complementing the evaluations of the greening and forestry measures of the CAP and the evaluation of the CAP's performance in achieving the objectives on 'climate action'.

[139] Regulations (EU) No 1307/2013, No 1305/2013, No 1308/2013 and No 1306/2013.

[140] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/impact-cap-habitats-landscapes-biodiversity_en.

[141] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/impact-cap-sustainable-management-soil_en.

[142] https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/cmef/sustainability/impact-cap-water_en.

complemented by analysis and data from various sources, including relevant evaluations. The methodological approach combines empirical methods (statistical analysis) with qualitative analysis (case studies, interviews and literature review).

The evaluation is constrained by the lack of sufficient and timely data (limiting a robust quantitative analysis), the very short observation period which only offers a narrow view of slower and longer-term environmental processes and the abundance of external factors affecting natural resources (e.g. urban sprawl, economic development, climate change).

The short observation period limits the potential of doing a robust analysis of the CAP's impact on the sustainable management of nature resources, especially considering that natural processes are lengthy and impacts materialise over longer periods. As such, merely looking at the available indicators during the observation period is insufficient to draw meaningful conclusions. An additional difficulty in arriving at a comprehensive and conclusive judgement on the impact of the 2014-2020 CAP instruments and measures on the sustainable management of natural resources stems from the variety of implementation choices made by individual Member States.

The evaluation is particularly relevant in light of the objectives of the EU biodiversity[144] and farm to fork[145] strategies, which complement the European Green Deal[146]. The increased emphasis on agro-environmental targets, combined with the need for a resilient, safe and sustainable food system ensuring food security, results in a demand to improve the balance between farming and nature. The sustainable management of natural resources remains a key CAP objective[147].

6.1. Effectiveness

The CAP provides an extensive 'baseline protection' with 84% of the total EU utilised agriculture area (UAA) subject to mandatory cross-compliance. Greening obligations provide additional environmental protection covering 80% of UAA, and voluntary commitments under pillar II add more targeted environmental provisions on 15% of UAA for AECM measures and on 5% of UAA supporting organic farming. The area subject to sustainable management commitments increased over the period evaluated.

Effectiveness of CAP instruments/measures

Regarding ***cross-compliance, GAECs*** have a key role in helping to maintain landscape elements (in particular buffer strips, grassed strips and terraces) and reduce soil erosion (GAECs 4 and 5). They also contribute to practices limiting the loss of soil organic matter (GAEC 4). However, GAECs 4, 5 and 6, which specifically target sustainable soil management, while often ensuring that the situation does not deteriorate further, could

[143] https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/1951-Evaluation-of-the-impact-of-the-CAP-on-water/public-consultation.

[144] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/EU-biodiversity-strategy-2030_en.

[145] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/actions-being-taken-eu/farm-fork_en.

[146] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal_en.

[147] Three of the nine key objectives of the European Commission proposal on the CAP for 2021-2027 address the environment and climate, notably environmental care, the preservation of landscapes and biodiversity, and climate change action. For more information, visit: https://ec.europa.eu/info/food-farming-fisheries/key-policies/common-agricultural-policy/future-cap/key-policy-objectives-future-cap_en.

have brought more beneficial effects at EU level, by triggering more changes of practices. Other GAECs and ***SMRs*** could have indirect positive effects on waterbodies by improving the capacity of soil to retain water, limiting erosion or maintaining specific land covers beneficial for water. But the study on soil reveals that case study Member States usually settled for minimum standards.

With respect to ***greening measures, ESPG*** plays an important role in preventing the ploughing of designated semi-natural permanent grassland habitats (as well as other wetlands and carbon rich soils which are often of high value for biodiversity). The ban on ploughing all ESPG and the permanent grasslands of Member States was paramount in taking action on carbon storage and erosion on those areas. Although the ban's added value in Natura 2000 sites is uncertain, given the protection already afforded by the Nature Directives, it is likely to bolster protection, given the evidence of ongoing losses of permanent grassland within the Natura 2000 network. The ban also has the potential to protect ESPG outside the Natura 2000 network, where the rate of loss of semi-natural grassland is especially high. Therefore it complements the Nature Directives. However, this potential is not realised due to the very low number of sites outside Natura 2000 sites with the ESPG designation.

Certain ***EFA*** elements, particularly fallow land, multiannual-fodder crops (e.g. alfalfa) and landscape features (e.g. hedgerows, trees and ponds) benefit biodiversity in arable landscapes. However, the potential benefits of the EFA measure are not fully realised, as the most commonly declared EFA elements (i.e. catch crops and nitrogen-fixing crops) have low biodiversity benefits for most farmland species, other than soil fauna. However, they can reduce water pollution and in so doing benefit aquatic ecosystems and biodiversity. They can also contribute to practices limiting the loss of soil organic matter and help foster activities improving soil biodiversity and reducing soil pollution through restrictions on plant protection products.

The ***crop diversification*** requirement was one of the key CAP instruments targeting soil quality. However, it had effects at EU level mainly on a small percentage of land, but on the most intensive areas. Furthermore, in certain situations, crop rotation could have yielded more environmental benefits than crop diversification. Nevertheless, positive effects were observed in some Member States (e.g. reduction of monoculture in Spain).

AECM (M10) and Natura 2000 (M12) are the most effective CAP measures addressing biodiversity objectives, particularly the tailored and targeted higher level AECM schemes. However, the impacts of AECM schemes are often constrained by limited budgets and farmer uptake, and the Natura 2000 measure has been infrequently used by Member States (despite a 45.5% increase in the areas supported under M12). ***Organic farming (M11)*** provides biodiversity benefits, particularly where it occurs in more intensively farmed landscapes, as it contributes to practices limiting the loss of soil organic matter and fosters activities positive on soil biodiversity and soil pollution through restrictions on the type of plant protection products and fertilisers.

Investment support (M4) under focus area 5A for increased efficiency in water use is beneficial for water abstraction and use[148]. An assessment was impossible due to the case

[148] However, there are mixed perceptions, with environmental experts claiming that insufficient compliance controls and monitoring hinder its effectiveness. Nevertheless, as water basin authorities are responsible for irrigation authorisations and monitoring water use, these possible drawbacks are not due to the CAP itself.

studies chosen. It is particularly difficult to determine to what extent the CAP instruments and measures helped to address biodiversity, habitats and landscape objectives in forest areas. Evidence of the biodiversity impacts of the ***forest measures (M8 and M15)*** and the afforestation and agroforestry elements of the EFA is lacking. However, these measures are not frequently used by Member States; and the pillar II measures are only targeted at very high biodiversity areas in a very few cases in the case study Member States. Therefore it is likely that they are having limited overall impacts, although locally these may be more significant.

ANC payments do not intrinsically contribute to environmental objectives. But they are likely to contribute to the household income of farming systems with a high nature value and thus contribute to the continued agricultural use of semi-natural habitats in Natura 2000 sites, as there is a high level of overlap between the areas.

With the exception of ANC payments, ***direct payments (including voluntary coupled support)*** may also maintain beneficial farming activities over wider areas. But they may also facilitate agricultural improvements and intensification. The impact on biodiversity resulting from this can be detrimental, unless it is limited through appropriate eligibility conditions that benefit environmental objectives.

Effectiveness of relevant CAP instruments/measures per topic

The overall contribution of the relevant CAP instruments and measures to ***biodiversity and landscapes*** is difficult to estimate due to the lack of sufficient data (notably field level indicators), different implementation choices by Member States and numerous external factors driving biodiversity change. But the available CMEF indicators do not point to particular improvements at the EU level over the (very short) observation period.

Regarding relevant CAP ***instruments and measures on soil-relevant management practices***, provisions on the use of plant protection products and fertilisers are highly relevant and concern a significant share of EU arable land. These provisions include cross-compliance, which sanctions beneficiaries when not complying with the relevant rules and helps to ensure compliance with the rules for animal fertiliser application to soil in nitrate vulnerable zones. The provisions also cover the ban on plant protection products on EFAs and support for organic farming.

The CAP has contributed to durable changes in farmers' practices by helping introduce the use of catch, cover and nitrogen-fixing crops. AECM contributes to practices limiting the loss of soil organic matter and encourages activities positive to soil biodiversity and soil pollution. AECM (M10) supported reduced tillage on arable land, but this was limited to specific areas and therefore did not lead to significant coverage at EU level. There were also limited effects on the maintenance of crop residues, manuring and compost application.

Given the limited observation period and lack of sufficient data, it was not possible to do a robust assessment of the impact of the relevant CAP instruments and measures on ***soil organic matter, soil biodiversity and soil pollution,*** and on changes in ***soil nutrient balance.*** The same holds for ***soil compaction and salinisation***, for which the CAP does not provide a targeted instrument or measure, and so its impact would be very limited by default.

The most relevant CAP ***instruments and measures for the sustainable management of water*** include cross-compliance, which strengthens the controls of requirements established outside the CAP (such as the Nitrates Directive) and sets minimum

mandatory standards for the good agricultural and environmental condition of land-targeting water (notably buffer strips, authorisation for water abstraction in case of irrigation, prohibition of discharging listed dangerous substances). Whereas cross-compliance provides a very basic level of protection, AECM (M10) and organic farming (M11) are the most effective pillar II measures to reduce agricultural pressures essentially on water quality. According to the CMEF result indicators, the percentage of irrigated land switching to more efficient irrigation systems was very limited at the EU level, and it is not possible to demonstrate the overall impact of irrigation measures on water use.

The limitations of available data make it difficult to assess the effects of relevant CAP instruments and measures on the ***water-holding capacity*** of soil or on the improvement of ***waterbodies status***. Soil and climatic conditions highly influence the effectiveness of the instruments and measures, and economic factors play a significant role in inducing farmers to implement specific agricultural practices or produce specific crops beneficial to water-related objectives.

With respect to ***land use and management***, the CAP helps to maintain particular land uses through various instruments and measures. CAP support is necessary to encourage non-profitable practices and land-use and to prevent the decrease of traditional practices beneficial for soil protection. The ESPG measure bans the ploughing of designated grassland and protects just under one third of permanent grassland in Natura 2000 areas and 1% of permanent grassland outside Natura 2000 areas. The EFA and, to a more limited extent, the crop diversification measure have helped stem the decline of fallow land in many Member States and stimulated increases in others. Direct payments in general (including basic payments, greening, voluntary coupled support and ANC) may have, to some extent, supported continued agricultural activity on semi-natural habitats that are at risk of abandonment.

AECM has supported extensive arable and grassland systems on 8.9 million hectares (11.6% of the area estimated to be of high nature value) and contributed to the maintenance and creation of landscape features, with 2.24 million hectares of ecological features under agreement by 2017 (field margins, buffer areas, flower strips alongside hedgerows and trees). The AECM is also used to support less intensive management on permanent crop and arable land through reduced inputs (5% of such land), soil cover and soil management techniques (2.8%) and feed and manure management (1%). Afforestation and the establishment of agroforestry systems were fostered by voluntary measures only and implemented to a limited extent, in coherence with the change they involve in land use.

6.2. Efficiency

The efficiency of relevant CAP instruments and measures was limited by implementation choices. Member States could have allocated more of their funding to the measures which deliver benefits for biodiversity most effectively (AECMs, Natura 2000 and conversion to organic farming), rather than less effective ones (e.g. ANC).

Soil-oriented AECMs can have more specific effects on soil quality for a lower cost/ha than support for organic farming. But the payment rates of AECMs were not always sufficient to motivate farmers to commit to the implementation of the supported soil-relevant activities. In some Member States, the calculation of the payment rate of AECMs (M10) fails to ensure sufficient uptake, in particular by highly productive farms.

On the other hand, payment rates under support for activities in forests (M8), organic farming (M11), and the environmental measures of fruits and vegetables operational programmes (CMO Regulation) were generally found to be set at an appropriate level to encourage application by farmers and forest holders in Member States covered by the case studies.

For organic farming (M11) in particular, payment rates can be considered efficient, given that organic farming greatly reduces the risks of water pollution from fertilisers and pesticides and its associated depollution costs. On the other hand, investments (M4) targeting water-relevant operations were not found to be very efficient for protecting water from pollution.

The ratio between distributed payments and the observed benefits of the crop diversification measure is considered low, mostly because it did not lead to significant changes in agricultural practices beneficial for sustainable soil management.

The CAP instruments and measures with the greatest benefits for biodiversity and soil (notably AECM (M10)) are also those with the greatest administrative cost, but that is considered overall as proportionate, given the inherent complexity of some of the management practices requiring support.

Administrations and farmers found support for organic farming (M11) less difficult to manage than AECM. Forest-environment and climate services (M15) and afforestation (M8) were both significant measures fostering land covers beneficial for water protection. However, they generate a heavy administrative burden. Investments (M4) generated a heavy administrative burden, and the beneficiaries also mentioned cooperation (M16) as being burdensome.

Greening measures and cross-compliance effectively helped to maintain specific practices beneficial for water protection. The administrative costs associated with the verifications of cross-compliance and greening measures are included in the general management system of the CAP (the Integrated Administration and Control System-IACS). The cost of IACS is significant but deemed as necessary in view of the benefits obtained. Regarding the soil-related GAECs, controllability and easy management have been a major concern for administrations, because of the high costs associated with these controls and the high financial risks for farmers in case of non-compliance. Some Member States increased the administrative complexity for themselves by deciding to give farmers EFA options which were already covered by cross-compliance standards for the good agricultural and environmental condition of land (GAEC).

6.3. Coherence

The ***internal coherence of the CAP instruments and measures*** to support the sustainable management of biodiversity, soil and water is considerable; and there are numerous opportunities for measures to be combined in ways which are synergetic. This is the case, for example, with support for the AECMs (M10), the organic farming measure (M11), the Natura 2000 measure (M12) and non-productive investments (M4). All of these can be used together and can also benefit from the support for knowledge transfer (M1), advisory services (M2) and cooperation (M16), as well as the farm advisory system. Voluntary coupled support for nitrogen-fixing crops and animal husbandry (which contributes indirectly to the maintenance of grassland and promotion of the use of manure under allowed limits) may indirectly have a positive effect on soil management.

However, a number of potential inconsistencies were identified:

- overlap between the greening requirement to declare EFA and the baseline set by cross-compliance for catch crops on nitrogen-vulnerable zones;
- risk that ANC support, direct payments and voluntary coupled support may lead to agricultural intensification with detrimental impacts on biodiversity;
- exemption of farmers participating in the small farmers scheme and permanent cropland from all greening requirements;
- irrigation support, as it is difficult to guarantee that the supported investment will not lead to increased pressure on water resources, especially in cases where the irrigated area increases;
- sector-specific support granted under the Regulation for the common organisation of the markets can be used to support investment in irrigation under less stringent rules than investments (M4);
- sectors with the highest impact on water quality and quantity (e.g. fruits, flowers, wine) are not always eligible for direct payments and thus not subject to corresponding greening and GAEC requirements.

CAP instruments and measures are mostly ***coherent with other related EU and national policies*** relevant for biodiversity, soil and water, with a number of EU environmental policies strongly linked with the CAP through statutory management requirements (e.g. the Water Framework Directive, the Nitrates Directive, the Sustainable Use of Pesticides Directive).

However, had Member States made different implementation choices and had they always used the most effective and efficient measures, the CAP could now in practice be delivering greater synergies with the EU's biodiversity strategy to 2020, in particular the implementation of the Birds and Habitats Directives and Natura 2000 network.

Inconsistencies can also arise in cases where CAP support is granted to increase irrigated areas where waterbodies with less than good quantitative status are affected. Granting direct payments to specific sectors with mixed effects on water, depending on their agricultural practices, prevents full coherence of the CAP with EU water policy. Also, specific sectors with a potential impact on water quality and quantity are not constrained by the water-relevant CAP instruments and measures in all Member States (i.e. cross-compliance, GAEC and the greening measures).

6.4. Relevance

Throughout the observation period, the CAP has been of important relevance in addressing the sustainable management of natural resources. Overall, the CAP has had a positive effect, in a situation where available context indicators pointed toward continued pressure on biodiversity, soil and water resources.

The relevance of CAP instruments and measures are established from the findings on effectiveness, efficiency and coherence. Overall, there is no single instrument or measure that can be qualified as the most relevant for addressing the objective of sustainable management of natural resources: cross-compliance measures, support to AECMs (M10) and organic farming (M11) appear to be beneficial across the evaluated areas. As mentioned before, the implementation choices of Member States greatly determine the effects of the instruments and measures.

The analysis identifies particular challenges that the CAP does not address sufficiently or at all in a relevant manner:

- Soil compaction, soil biodiversity and pollution lack targeted measures.
- Crop diversification did not sufficiently induce the implementation of diversified crop rotations beneficial to soil quality.
- The CAP was unable to provide farmers a specific safety net to encourage risk taking when switching to conservation farming practices.
- Specific measures are lacking to target the use of pharmaceutical products or cleaning products in the livestock sector (regarding water quality).
- Help was lacking for irrigated farms to adapt to water scarcity stress episodes, by supporting their diversification with rain fed crops in areas prone to droughts.

The water-related needs not covered by the CAP are sometimes addressed through national policies.

6.5. EU added value

Overall, the CAP instruments and measures, particularly those programmed under the EAFRD, provide EU added value to biodiversity and landscapes, soil and water. They do this chiefly by **setting a higher level of ambition and requiring minimum levels of financial support** to be allocated to these objectives than would likely be the case if Member States were left to design national measures themselves (given their preference for financial/economic priorities[149]). This means Member States have to use 30% of their direct payment allocation for pillar I and 30% of their EAFRD budget for specific environmental and climate measures, which might not be the case without the CAP.

EU added value is also created by **treating these natural resources on an EU level**, as water resources, biodiversity and soil transverse borders and are a shared responsibility. Natural resources require **transboundary management** and joint actions to ensure consistency, which the EU provides. A joint action at EU level also creates a level playing field for all Member States, provided that the system of controls and sanctions at Member State level do not lead to distortions.

The CAP also gives Member States **legal certainty** on objectives and the availability of funding availabilities for natural resources for the duration of the programming period.

The EU-level **networking and knowledge sharing** funded by the CAP also deliver EU added value by helping to improve the CAP's effectiveness in delivering its objectives. European Innovation Partnership for Agriculture groups and European Network for Rural Development focus groups have encouraged coordination among European researchers, civil society, companies at EU level. However, the CAP has brought little gains in coordination between authorities of the EU Member States and regions, with one of the main obstacles for coordination among Member States being the lack of common definitions of soil quality and soil threats.

6.6. Lessons learned

The presence of the CAP has raised Member States' ambition to address sustainable resource management objectives and their level of funding, creating EU added value.

[149] Economic drivers such as improving the competitiveness of agriculture, maintaining the viability of farming in remote rural areas and financial and administrative simplification strongly influenced the implementation choices by Member States.

There is room for Member States and regions to improve their implementation choices, so that they better reflect environmental objectives and the design of policy measures and ultimately ensure effective, efficient and coherent outcomes. With respect to particular instruments and measures:

- Member States have not made sufficient use of the available CAP instruments and measures to protect semi-natural features, in particular grassland.
- The design and funding of AECM support has been insufficiently attractive to bring about the changes in management necessary to improve their biodiversity performance, especially for intensive cropping farms.
- Member States could have used a wider range of CAP instruments and measures to support the co-existence of agriculture with biodiversity.
- The implementation of knowledge and advisory services is beneficial for a better understanding of environmental perspectives and appropriate follow-up, including implementation choices at farm level.

At the level of the CAP,

- potential inconsistencies/overlaps in the design of the policy can hinder the overall outcomes of sustainable management of natural resources;
- including ANC payments in the 30% earmarking of EAFRD could result in a less efficient use of the funds targeting measures with direct environmental benefits beyond conditionality;
- the policy design does not address certain pressures and needs (see relevance) in a sufficient manner, or at all, leaving room for improving the relevance of the CAP in addressing the sustainable management of natural resources;
- an overall assessment of the CAP's impact on the sustainable management of natural resources has not been possible due to the absence of suitable monitoring data, common definitions (of soil, sustainable soil management, conservation agriculture and soil threats), and/or quantified targets in EU legislation (for soil).

Although the evaluation comes late in the policy discussions on the post-2020 CAP, its conclusions validate relevant policy elements proposed for the post-2020 CAP, including the need for a more strategic approach to improve targeting, consistency of approach and overall performance (with this in mind, greater flexibility for Member States but with safeguards), and improved funding and incentives. Key aspects of the Commission's proposal for a post-2020 CAP included the following:

- a strategic planning approach encompassing most elements in both pillars of the CAP together;
- greater conditionality to replace the current cross-compliance and 'greening' – improving existing standards and introducing new standards for water, soil, biodiversity, landscapes and the climate, while also introducing the Water Framework Directive and the Directive on sustainable use of pesticides into the system of conditionality;
- eco-schemes in pillar I - supporting voluntary action going beyond conditionality and other obligations (e.g. agro-ecology and precision farming);
- ongoing possibilities of support through CAP pillar II for environment- and climate-related farming and forestry practices, investments, knowledge-building

and innovation – with ANC payments no longer taken into account for the mandatory minimum spending level on the environment and climate of 30% of the EAFRD[150];

- stronger links with EU legislation on climate change, energy, water, air and pesticides;
- an explicit obligation for Member States to show greater ambition to address the environment and climate through the CAP than in the 2014-2020 policy period.

Most of these elements survived in essence in the political agreement reached by the Council and the European Parliament.

The Commission proposal also introduced a performance monitoring and evaluation framework including a set of common indicators, data collection and regular reporting on performance, monitoring and evaluation activities to help the CAP move from compliance to results and to better explain the CAP's achievements and simplify the administrative burden linked to monitoring (by using satellite imagery and other modern technological solutions).

To better assess the CAP's impact on biodiversity, two impact indicators were added to the new performance monitoring and evaluation framework (PMEF). These are indicators on habitats and species (relying on Member States' notifications to the Directorate-General for Environment) and landscape elements (under development by the Joint Research Centre and the European Environmental Agency). In addition, to improve data completeness, the use of notifications to other Directorates-General were enhanced and legal bases were introduced where needed, notably to replace data provision based on 'gentlemen agreements' (e.g. for gross nutrient balances).

In addition, the lack of information on farming practices will be solved by the detailed explanations on interventions implemented by Member States in the CAP plans and the detailed reporting by interventions in the annual performance reports.

Whatever the case, the difficulty of quantifying the net impact of the CAP on natural resources will remain, given the effects of the other factors playing a role and the time needed for outcomes to materialise.

The findings of the evaluation will inform the Commission's involvement and support to the Member States as they develop their strategic plans for the next CAP period.

[150] As outcomes of negotiations with the European Council and Parliament: a mandatory minimum spending level of 25% of the direct payment budget was introduced for eco-schemes; the minimum expenditure on the environment and climate from the EAFRD was increased to 35%; the 35% will also include spending on animal welfare, as well as 50% of spending on ANC payments.

ANNEX 1: PROCEDURAL INFORMATION

1. Lead DG, D*e*cide Planning/CWP references

The evaluation was approved in the European Commission planning of legal initiatives, under PLAN/2020/6815[151]. The evaluation was organised and conducted by the Directorate-General for Agriculture and Rural Development (DG AGRI), according to its evaluation and studies plan.

2. Organisation and timing

This evaluation was included in the DG AGRI evaluation plan. It followed the 'better regulation' guidelines for evaluations. The evaluation incorporated the work carried out through three individual external studies (on biodiversity, soil and water) that were contracted through a service request under a framework contract. The work was supervised under the technical and contractual management of AGRI unit C.4 in charge of monitoring and evaluation.

An interservice steering group was set up by the Commission on 7 April 2020, to: (i) ensure that all relevant policy areas are considered through the participation and contribution of experts to the draft evaluation staff working document; and (ii) comment on the draft open public consultation that will contribute to the staff working document.

The interservice steering group was composed of the Secretariat-General of the Commission and DGs AGRI, BUDG, CLIMA, COMP, ENER, ENV, ESTAT, GROW, JRC, REGIO and SANTE, and involved the European Environment Agency. The interservice steering group held its first meeting on 8 May 2020 to discuss the context and envisaged process and exchange on the draft public consultation. The second meeting was held on 28 April 2021 to discuss the draft staff working document before its submission to the Regulatory Scrutiny Board.

The evaluation had no individual roadmap. The roadmap consultations on the underlying evaluations ran between 29 October – 26 November 2018 on water (12 replies), 8 November – 6 December 2018 on biodiversity (36 replies) and 30 July – 27 August 2019 on soil (18 replies). An online public consultation was carried out between 9 July - 22 October 2020 (see Annex 2).

3. Exceptions to the 'better regulation' guidelines

No exceptions were requested for the evaluation, apart from the merger of the three underlying evaluations on biodiversity, soil and water.

4. Consultation of the Regulatory Scrutiny Board

The Regulatory Scrutiny Board scrutinised the evaluation report at a meeting on 2 June 2021, and provided a positive opinion. However, the Board also considered that the report should be improved regarding the following aspects.

[151] Replacing PLAN/2018/4284 (biodiversity), PLAN/2018/4340 (water) and PLAN/2019/5582 (soil).

Regulatory Scrutiny Board remark	Considerations for the report
1) The report is not sufficiently clear on why conclusions cannot be drawn on the effectiveness of the assessed CAP measures for the sustainable management of resources.	The report makes it clear that the short observation period limits the potential of a robust analysis of the impact of the CAP on the sustainable management of natural resources, in particular considering that natural processes are lengthy and impacts materialise over longer periods. The report highlights that the performance of the CAP is affected by various external factors. As such, it is virtually impossible to estimate the net impact of the CAP on the sustainable management of natural resources. The report also highlights that only looking at the available indicators during the observation period is insufficient to draw conclusions. For a more comprehensive assessment, there would be need for a broader set of indicators on specific issues and a sufficient observation period that provides representative and robust data.
2) The report is not sufficiently clear on how its findings can be used in the policy process.	The report acknowledges that although the evaluation comes late in the policy discussions on the post-2020 CAP, its conclusions validate relevant policy options proposed for the post-2020 CAP, including the need for a more strategic approach to improve the targeting of interventions, improved funding and incentives, while putting safeguards in view of the flexibility left to Member States. The findings of the evaluation should also inform Member States in the context of developing their national CAP Strategic Plans for the next CAP period, and guide the Commission when approving the strategic plans.

5. Evidence, sources and quality

Relevant data and information were gathered in the evaluation support studies, the public consultation and from a broad range of sources, to build an evidence basis for the evaluation (see Annex 3).

ANNEX 2: STAKEHOLDER CONSULTATION

A number of consultation activities were carried out at different points in time for the elaboration of the evaluation, including consultations by the Commission and surveys and interview in the context of the studies on biodiversity, soil and water.

Regarding the **consultations carried by the contractors** for, and during, the elaboration of the evaluation support studies on biodiversity, soil and water, these took the form of interviews with key stakeholders. They were used to gather in-depth qualitative information and the opinions of key stakeholders (managing authorities, researchers and other local experts working on agricultural soils, farmer representatives and advisors, NGOs) relative to context, implementation and results in the case study countries. Some additional interviews were conducted with specific project managers and researchers. Each of the evaluation support studies also carried out a survey with farm advisors in the case-study Member States. It collected qualitative information on the drivers and choices made by the farmers regarding their practices and their uptake of innovations. Interviews and surveys were then used in all of the replies to the evaluation study questions by the contractors (except on soil where survey was only used for answering to the question 9).

The Commission has also carried a number of consultations, starting with the individual **roadmaps for the evaluations** of the impact of the CAP on the sustainable management of biodiversity, soil and water. The feedback of the roadmaps took place from 29 October 2018 to 26 November 2018 for water, 8 November 2018 to 6 December 2018 for biodiversity and 30 July 2019 to 27 August 2019 for soil. These roadmaps included key aspects to be covered by the evaluation, such as purpose and scope, data collection and methodology, consultation of citizens and stakeholders. The total feedback received for the three roadmaps were 66 responses from citizens, sectorial and industry associations, business organisations, environmental NGOs, confederation of service providers, public administrations, among others.

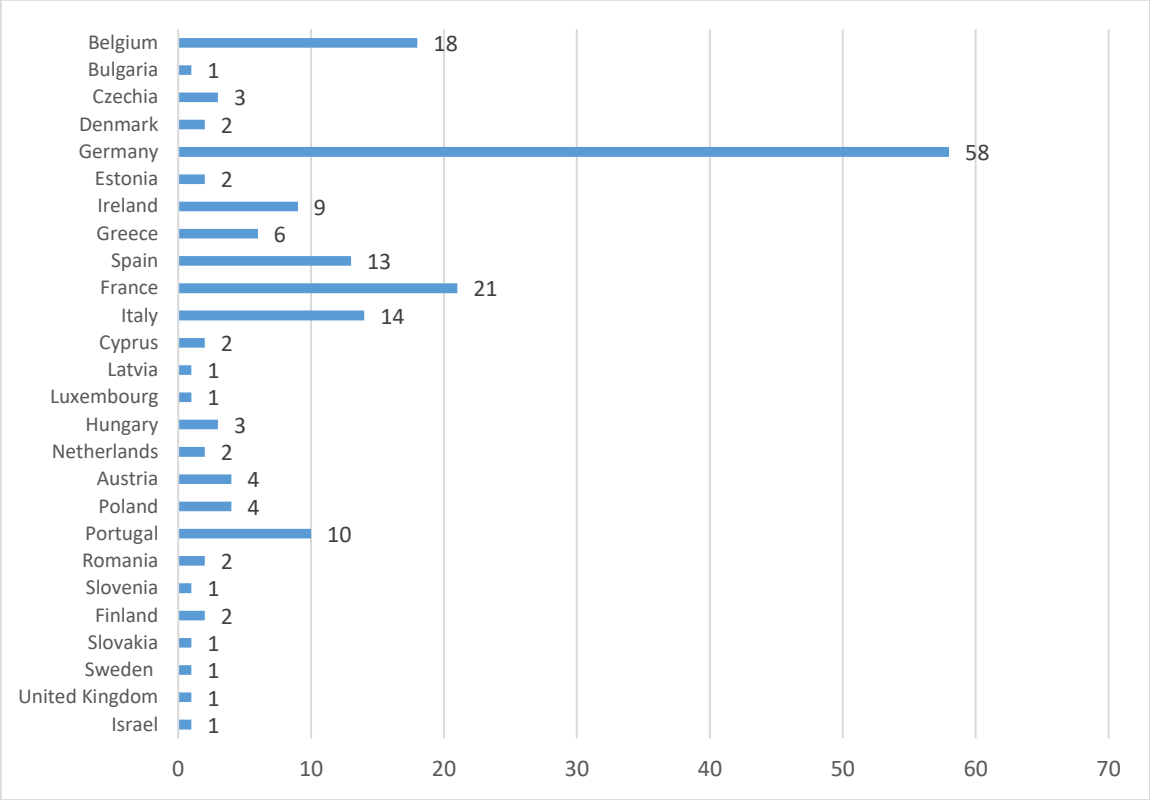
The overall position of respondents about the roadmaps was neutral, deeming the evaluations necessary and raising points for the analysis of the impact of the CAP on biodiversity, soil and water. The difference between user types did not yield major differences in the kind of answers provided. A large number of respondents (notably to the roadmap consultation on biodiversity) pointed to the importance of agricultural emissions, even if the subject was not in the scope of the evaluation, but covered by a specific evaluation. Overall, the feedback to the roadmap consultations provided useful input to the drafting of the relevant technical specifications on the evaluation support studies when not covered already in the relevant evaluation approaches.

The **public consultation** on the evaluation of the EU common agricultural policy's impact on biodiversity, soil and water (natural resources) was conducted from 9 July 2020 to 22 October 2020 via EU Survey. It was a comprehensive consultation with specific questions covering biodiversity, soil and water and the individual evaluation criteria of effectiveness, efficiency, relevance, coherence and EU added value.

A total of 183 contributions were received from 25 EU Member States[152] and Israel with different levels of replies.

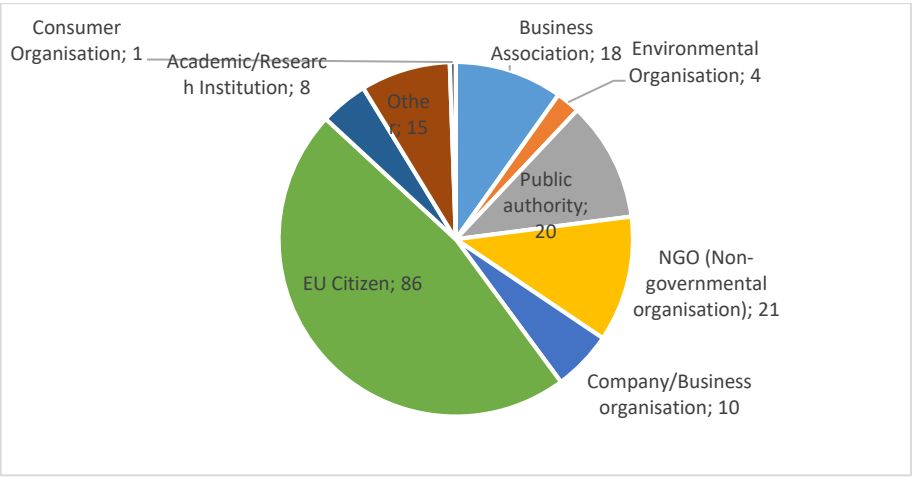
[152] Including the UK, which was considered as a Member State for the purpose of the consultation (and in line with the observation period). There were no contributions from Croatia, Malta and Lithuania.

Figure 25 Number of respondents to the public consultation by country of origin



Source: public consultation

Figure 26 Number of respondents to the public consultation by affiliation



Source: public consultation

EU Citizens provided the most contributions to this consultation accounting for 47% of all respondents (number of responses 'N'=86), followed by NGOs for 11% of all respondents (N=21), public authorities for 11% of all respondents (N=20) and business associations for 11% of all respondents (N=18). Of all the respondents, company/business organisation accounted for 5% of the total responses (N=10), academic/research institutions 4% (N=8), environmental organisations 2% (N=4) and consumer organisations less than 1% (N=1). The remaining 9% (N=15) of respondents identified themselves as 'others'.

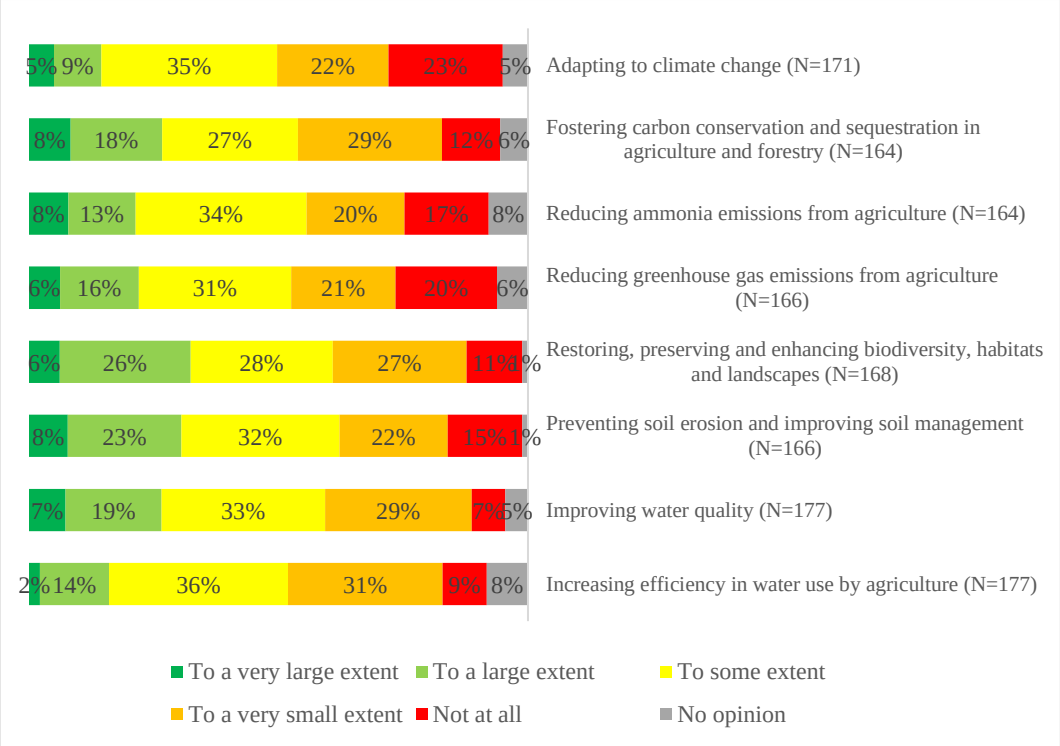
On the sectors represented by the respondents, 'agriculture (farming)' is the most common, with 65 respondents (36%), followed by 'environmental protection sector', 32

(18%), ‘civil society’, 19 (10%), ‘farm advisory services’, 12 (7%), ‘forestry, including agri-forestry’, with 8 responses (4%), ‘development of rural areas’, 7 (4%) and lastly, ‘input producers (i.e. fertilisers, pesticides, seed, machinery)’ and ‘other service providers and agricultural contractors’, both with 2 answers. The rest (35%) corresponds to ‘other’ sectors.

Analysis of results

A majority of respondents consider that the CAP contributed to the achievement of the environmental objectives of the EU to a very large extent, to a large extent or to some extent. However, the perception varies across the different objectives, with biodiversity and soil receiving the highest rate of positive (very large or large extent) replies and climate and GHG the highest rate of negative (not at all) replies.

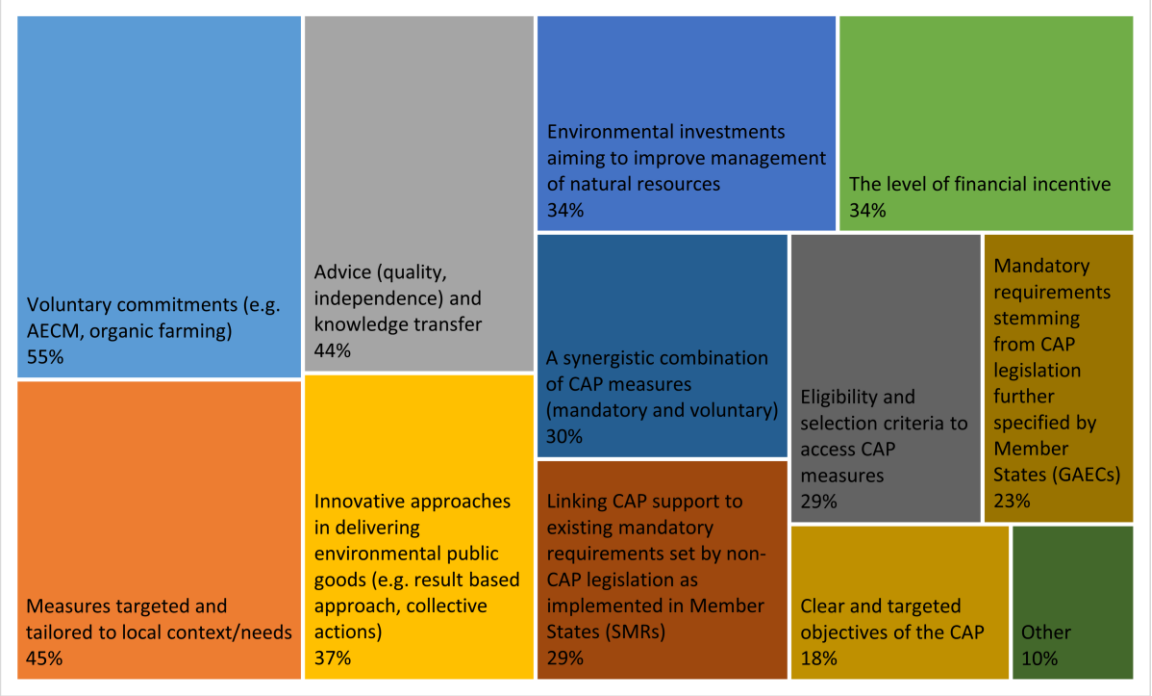
Figure 27 CAP contribution to environmental objectives of the EU



Source: public consultation

Responses on the main drivers of success in the implementation of CAP instruments and measures to contribute to sustainable management of natural resources confirm the prominent role of ‘voluntary commitments (e.g. AECM, organic farming)’.

Figure 28 Drivers of success in CAP implementation contributing to sustainable management of natural resources



Source: public consultation

Figure 29 Main factors limiting CAP implementation contributing to sustainable management of natural resources



Source: public consultation

Answers to the question on the main factors that limit the contribution to sustainable management of natural resources through the implementation of the current CAP instruments and measures pointed to the 'insufficient level of financial incentives', 'low ambition of the measures', 'an insufficient budget allocation', 'the lack /quality /independency of farm advice' and 'disproportionate administrative burden for beneficiaries (fear of excessive controls)' as the most important elements.

Regarding the question on the effectiveness of the CAP instruments that contribute to sustainable management of biodiversity, habitats and landscapes, the instruments that were perceived the most effective were the support to organic farming (47%), investment support for forestry (afforestation, agroforestry) (45%), Natura 2000 and Water Framework Directive payment (43%). On the other hand, the instruments that were perceived the least effective were the mandatory practices (GAEC) without financial support (46%), and investment sup-port on farms (45%).

Concerning the question on the effectiveness of the CAP instruments that contribute to sustainable management of soil resources, the instruments that were perceived as most effective (sum of 'very large' and 'large' extent) by the respondents, were the support to organic farming (47%) agri-environment-climate voluntary commitments (39%) and mandatory practices with financial support (Greening) (39%). The instruments that were perceived least effective by respondents (sum of 'very small extent' and 'not at all'), were the investment support on farms (35%), cooperation (33%) and mandatory practices (GAEC) without financial support (33%).

Regarding the question on the effectiveness of the CAP instruments that contribute to sustainable management of water in terms of water quantity (in %), the instruments that were perceived the most effective were investment support on farms (33%), Natura 2000 and Water Framework Directive payments (33%), knowledge transfer and advice (32%) and innovation (40%). The CAP measures and instruments that were perceived as the least efficient were mandatory practices (GAEC) without financial support (35%) and linking CAP support to compliance with specific non-CAP regulatory provisions (SMR) (35%).

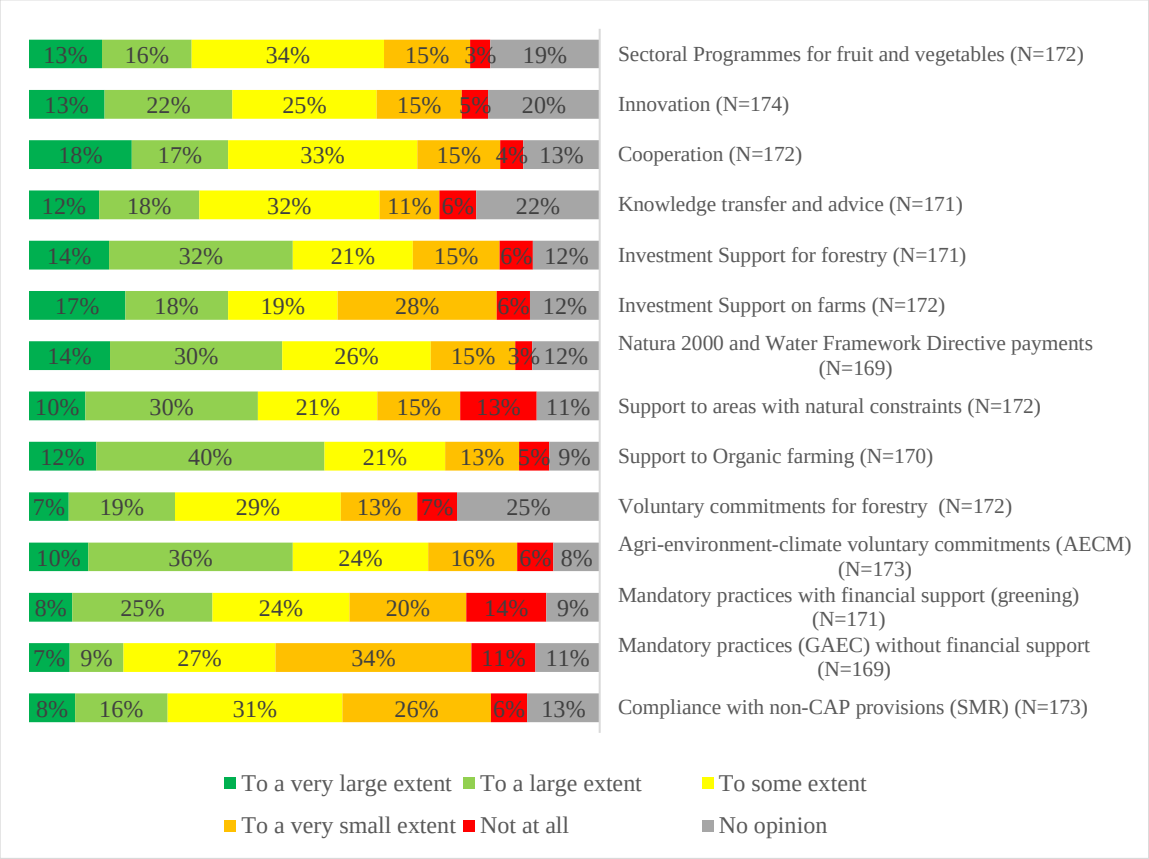
Concerning the question on the effectiveness of the CAP instruments that contribute to sustainable management of water in terms of water quality, the instruments that were perceived the most effective were support to organic farming (41%), Natura 2000 and Water Framework Directive payments (39%) and agri-environment-climate-voluntary commitments (AECM) (37%). The CAP measures and instruments that were perceived the least efficient were mandatory practices (GAEC) without financial support (38%), support to areas with natural constraints (35%) and cooperation (33%).

A large share of respondents could not determine the effect of the implementation of the de-coupled income support and the voluntary coupled support on natural resources (40% and 43% respectively). For sectoral programmes and other CAP instruments, the responses were mixed, but in both cases the highest shares were given to 'negative effect' (30% and 32% respectively).

Respondents have a generally positive perception about the extent to which the CAP instruments and measures implemented by the Member States for the sustainable management of natural resources with its available budget is relevant (or not). Exceptions to this are the mandatory practices (GAEC) without financial support, mandatory practices with financial support (greening), and linking CAP support to the compliance with specific non-CAP regulatory provisions (SMR).

According to the replies, the main aspects of administrative cost/burden in the implementation of the current CAP instruments and measures to achieve the objectives relevant to sustainable management of natural resources fall on beneficiaries (61%), followed by ad-ministrations (33%) and other (6%). For beneficiaries the major cost/burden is the 'complexity to submit an aid application' (36%), followed by 'too much time and effort required for administrative controls' (23%), 'too much time required to receive the payment after sub-mitting the aid application' (21%) and 'too frequent changes in the policy' (20%). For administrations the clear source of cost/burden are 'too frequent changes in the policy' (51%), followed by 'complexity of management in the administrative system' (35%) and the 'complexity due to a decentralized administrative system' (14%).

Figure 30 Extent to which the relevant applicable CAP instruments and measures as implemented by the Member States for the sustainable management of natural resources generate the best possible results on management of natural resources with its available budget



Source: public consultation

A significant share of the respondents considers that the CAP instruments and measures which contribute to sustainable management are coherent, 'to some extent' (with 70 responses out of 170, i.e. 40%). 38 (21%) replied 'coherent to a very small extent', 'not at all coherent' was chosen by 29 (16%), 'to a large extent' by 30 (17%) and 'to a very large extent' by 4 (2%) of the respondents.

Regarding the coherence of the applicable CAP instruments and measures regarding the sustainable management of natural resources, the instruments that were perceived the most positively (sum of 'fully coherent' and 'mostly coherent') were: Water Framework Directive (37%) Nitrates Directive (36%) Habitats Directive (33%). On the other hand, the instruments and measures perceived the least coherent were: Sustainable Use of

Pesticides Directive (32%) EU Biodiversity Strategy to 2020 (29%) EU strategy on adaptation to climate change (29%).

The overwhelming majority of the respondents found either very relevant or somewhat relevant the available CAP instruments and measures to respond to the actual needs in terms of sustainable management of soil within the EU. This perception is kept for the relevance of the instruments and measures to the needs of sustainable management of water use, along with that of water quality.

A significant share of respondents (46% of 183 replies, sum of 'to a large extent' and 'to a very large extent') found that the relevant applicable CAP instruments and measures create EU added value with respect to sustainable management of natural resources, of which 16 (9%) 'to a very large extent' and 65 (37%) 'to a large extent'. On the other hand, 54 of the respondents (31%) answered that there is EU added value 'to some extent', 23 (13%) 'to a very small extent' and 11 (6%) responded that 'not at all'. The remaining 7 (4%) did not have an opinion.

Analysis of the position papers

24 position papers were submitted as attachments with the replies to the public consultation. Most of the respondents submitting a position paper welcomed the opportunity to present their views on the sustainable management of the EU CAP instruments and measures, especially in the context of the Farm to Fork Policy, the European Green Deal and the new CAP for the 2021-2027 period, even if the content of the consultation concerned the past performance of the CAP.

Food production was a major topic for respondents, along with agricultural production (highlighting sustainable and organic production) and contributions were provided on the new CAP plan. In accordance, respondents also supported the use of this questionnaire for the elaboration of the new CAP, but lamented that the questionnaire came late for it.

Some of the respondents also, similarly to the roadmap analysis, provided new evaluation criteria and sources, but there was no clear-common view on this between respondents. Funding allocation was also suggested as a potential change, but there was not common point among respondents. There was a common ground on maintaining the level of funding to the CAP, especially among farmers, as it is found as a requirement for achieving the sustainability and greening objectives of the future CAP. Some other respondents emphasised that more resources (from the overall CAP share) should be allocated to the greening measures to increase the sustainable management of natural resources, with mentions to all three natural recourses from different respondents. Another source of common point is the administrative burden the CAP can represent for farmers, and thus it is asked for the new CAP to be kept simpler.

ANNEX 3: METHODS AND ANALYTICAL MODELS

The methodological approach to the evaluation combined quantitative and qualitative analysis, including a literature review, desk research, econometric analysis, surveys, interviews and case studies, primarily as part of the external and independent evaluation support studies carried out by Alliance Environnement. DG AGRI further complemented the studies with additional analysis (using up-to-date statistics) and synthesis of newly available literature.

Table 9 Description of the data collection and analytical tools

Method/Tool	Brief description of tool	Type of tool	Relevant evaluation questions' chapter
Data collection tools			
Documentary research / Literature reviews / statistical data analysis	The study encompassed a review of the available bibliography with regards to the implementation and impacts of the CAP. That included in particular previous studies of the CAP at the EU level, as well as previous evaluation studies, rural development programmes (RDPs) and their annual implementation reports (AIRs) in the case-studies areas. Specific literature reviews have been performed on key subjects: - The theoretical effects of changes in pressures of water quality, quantity, soil and biodiversity - The role played by agricultural practices on water related pressures, soil and biodiversity - Effects of agricultural and forest activities on water, soil and biodiversity; - Effects of key soil-relevant practices on soil productivity; - Technological and social innovations expected or proven to have a significant impact on natural resources; - Effects of operations similar to those supported by the CAP, in the EU member states and abroad.	Qualitative & quantitative	All
Surveys	Used to gather data from a small, non-representative sample of farmers in each of 10 case study countries (from each of the evaluation support studies) on their experience of sustainable management of natural resources, its pressures and relevant CAP instruments. Also used with farm advisers to gain information on the extent of uptake of different types of innovation and cooperation.	Quantitative and qualitative	Causal analysis Effectiveness
Case studies	Case studies are used as an evaluation tool when 'how' and 'why' questions are being posed. They allow a detailed examination of specific issues to be carried out in line with the evaluation goals.	Qualitative & quantitative	All
Analytical tools			
Stakeholder analysis	Stakeholder analysis was carried out at each step of the evaluation study, in order to prepare interviews with the relevant stakeholders and to analyse the information they provided in the light of their levels of participation, interests and influence on the CAP implementation on the sustainable management of natural resources	Qualitative	All
Matrix scoring	The scoring involves qualitative judgements of the interactions to be carried out and requires triangulation with other data sources to ensure the analysis is robust	Qualitative and quantitative	All

Method/Tool	Brief description of tool	Type of tool	Relevant evaluation questions' chapter
Counterfactual	Used to analyse the effects of measures by comparing situations between beneficiaries and non-beneficiaries of measures.	Qualitative	EU Added-value

The **case studies** provide detailed and context-specific qualitative and quantitative information to complement the EU-wide information collected to inform the analysis and answers to the evaluation questions. The information was gathered through interviews with key stakeholders, including advisers and representatives of the farming, forestry and wider rural sectors, regional and national government representatives and environmentalist researchers and NGOs, and by sourcing and analysing national/regional literature, statistics and other data sources. All information from the case studies has been carefully interpreted to determine what generic conclusions can be drawn from them for the analysis and answers to the evaluation questions.

Table 10 Case studies selection criteria, by natural resources

Biodiversity	Soil	Water
Biogeographical characteristics and main land use types	Biogeographical zones	Selection criteria for water is made according to the River Basin District (RBDs) geographical features, as it is the implementation level of the River Basin Management Plants (RBMPs)
Farm sector structure and land management	National policy framework	
Habitats and biodiversity trends in the agricultural sector	Intensity and methods of production	
CAP instrument and measure implementation choices	Implementation choices of soil-related CAP instruments and measures	
	Intensity of soil threats	

Table 11 Case Studies at EU level on water, biodiversity and soil, by countries

Biodiversity	Soil	Water
Germany (Land of Baden-Württemberg)	Belgium (Wallonia)	Austria
France (department of Val de Loire)	Bulgaria	Germany (North-Rhine Westphalia)
Croatia	Czechia	Spain (Aragon)
Hungary	Germany (Bavaria)	Finland
Ireland	Denmark	France (Alsace)
Latvia	Greece	Croatia
Netherlands	Spain (Aragon)	Italy (Apulia)
Portugal	Ireland	Netherlands
Romania	Italy (Toscana)	Poland
Slovakia	Sweden	Romania

Limitations and robustness of findings

There were methodological challenges in establishing the results that have occurred related to natural resources. These implicate limitations of the analysis and weaken the robustness of the findings. The main challenges are listed below:

- Complex cause-effect relationships associated with specific farm and forest practices and their different environmental impacts in different locations and at different scales, which make it difficult to measure the net impact of a given measure.
- Despite the extensive monitoring of the CAP and data collection from EU farms, the available databases do not make it possible to assess the effects of the CAP on natural resources at farm nor at local level, especially on soil and water quality. Its impacts could be approached only through expected effects and changes in general impact metrics.
- A specific effect of a measure of the CAP on one of natural resources cannot be isolated from the effects from another one of the measures targeting the same or other resource. For example, a natural resource sub-measures may have been programmed under other focus areas or priorities when the actions also benefit other objectives (e.g. farm competitiveness affecting water.)
- Difficulties in accessing data. Issues regarding FADN were already assessed in chapter 4. For other cases, like water, Water Information System for Europe (WISE) data are available for the two periods of time covered by the River Basin Management Plants, but the specific year when the data were collected is not mentioned. The use of surveys to farmers and stakeholder interviews allowed to circumvent some of these issues.
- Issues of scaling up results from case studies to form generalised judgments at EU level. The case studies are chosen to represent the variety of environments present in the EU, but does not make the choices representative at EU level for extrapolation purposes.

All these limitations inevitably have an impact on the robustness of the conclusions that can be drawn.

ANNEX 4: TABLES AND FIGURES COMPLEMENTING CHAPTER 2

Table 12 Rules on cross-compliance

Area	Main Issue	Requirements and standards		
Environment, climate change, good agricultural condition of land	Water	SMR 1	Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991, p. 1)	Articles 4 and 5
		GAEC 1	Establishment of buffer strips along water courses	
		GAEC 2	Where use of water for irrigation is subject to authorisation, compliance with authorisation procedures	
		GAEC 3	Protection of ground water against pollution: prohibition of direct discharge into groundwater and measures to prevent indirect pollution of groundwater through discharge on the ground and percolation through the soil of dangerous substances, as listed in the Annex to Directive 80/68/EEC in its version in force on the last day of its validity, as far as it relates to agricultural activity	
	Soil and carbon stock	GAEC 4	Minimum soil cover	
		GAEC 5	Minimum land management reflecting site specific conditions to limit erosion	
		GAEC 6	Maintenance of soil organic matter level through appropriate practices including ban on burning arable stubble, except for plant health reasons	
	Biodiversity	SMR 2	Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (OJ L 20, 26.1.2010, p. 7)	Article 3(1), Article 3(2)(b), Article 4(1), (2) and (4)
		SMR 3	Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7)	Article 6(1) and (2)
	Landscape, minimum level of maintenance	GAEC 7	Retention of landscape features, including where appropriate, hedges, ponds, ditches, trees in line, in group or isolated, field margins and terraces, and including a ban on cutting hedges and trees during the bird breeding and rearing season and, as an option, measures for avoiding invasive plant species	
Public health, animal health and plant health	Food safety	SMR 4	Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (OJ L 31, 1.2.2002, p. 1)	Articles 14 and 15, Article 17(1) and Articles 18, 19 and 20
		SMR 5	Council Directive 96/22/EC of 29 April 1996 concerning the prohibition on the use in stockfarming of certain substances having a hormonal or thyrostatic action and beta-agonists, and repealing Directives 81/602/EEC, 88/146/EEC and 88/299/EEC (OJ L 125, 23.5.1996, p. 3)	Article 3(a), (b), (d) and (e) and Articles 4, 5 and 7

	Identification and registration of animals	SMR 6	Council Directive 2008/71/EC of 15 July 2008 on identification and registration of pigs (OJ L 213, 8.8.2005, p. 31)	Articles 3, 4 and 5
		SMR 7	Regulation (EC) No 1760/2000 of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products and repealing Council Regulation (EC) No 820/97(OJ L 204, 11.8.2000, p. 1)	Articles 4 and 7
		SMR 8	Council Regulation (EC) No 21/2004 of 17 December 2003 establishing a system for the identification and registration of ovine and caprine animals and amending Regulation (EC) No 1782/2003 and Directives 92/102/EEC and 64/432/EEC (OJ L 5, 9.1.2004, p. 8)	Articles 3, 4 and 5
	Animal diseases	SMR 9	Regulation (EC) No 999/2001 of the European Parliament and of the Council of 22 May 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies (OJ L 147, 31.5.2001, p. 1)	Articles 7, 11, 12, 13 and 15
	Plant protection products	SMR 10	Regulation (EC) No 1107/2009 of the European Parliament and of the Council of 21 October 2009 concerning the placing of plant protection products on the market and repealing Council Directives 79/117/EEC and 91/414/EEC (OJ L 309, 24.11.2009, p. 1)	Article 55, first and second sentence
Animal welfare	Animal welfare	SMR 11	Council Directive 2008/119/EC of 18 December 2008 laying down minimum standards for the protection of calves (OJ L 10, 15.1.2009, p. 7)	Articles 3 and 4
		SMR 12	Council Directive 2008/120/EC of 18 December 2008 laying down minimum standards for the protection of pigs (OJ L 47, 18.2.2009, p. 5)	Article 3 and Article 4
		SMR 13	Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes(OJ L 221, 8.8.1998, p. 23)	Article 4

Source: Regulation (EU) No 1306/2013, Annex II (see Figure 1)

ANNEX 5: BENCHMARK: THE SITUATION PRIOR TO THE 2014-2020 CAP

In 2012, EU-28 total utilised agricultural area (UAA) stood at 178.2 million hectares, of which permanent grassland and meadow accounted for 33.2%[153]. The share of the different land cover categories varies across the EU and is correlated with the physical characteristics of the territory such as mountains and remoteness of the area. Agricultural area accounted for 45.5% of total area, natural grassland 2.4%, total forest area 31.7%, transitional woodland shrub 4.8%, and natural area 5.0%[154].

Areas facing natural and other specific constraints (ANCs) accounted for 54.4% of total UAA in 2005, with 16.2% mountain areas, 34.4% other areas and 3.8% areas affected by specific constraints[155].

In 2013, UAA managed by farms with high input intensity per hectare accounted for 36.6% of total UAA[156]. In 2010, 29% of the UAA in the EU-28 was devoted to extensive grazing[157], with a total amount of 50 million hectares, albeit with significant differences among the Member States.

Natura 2000 areas (including natural grassland) accounted for 10.9% of UAA in 2011[158].

The farmland birds index stood at 81.9% in 2013 (compared to 2000), following a steady decline since 2000[159]. The grassland butterflies population index stood at 66.5% in 2013 (compared to 1990)[160]

The conservation status of agricultural habitats (grassland) in 2012 was deemed 'favourable' in 20.9% of assessments of habitats, compared to 38.6% 'unfavourable – inadequate' and 38.2% 'unfavourable – bad' (remaining 2% unknown)[161].

High nature value farming accounted for 32.3% of total UAA in 2012[162].

The share of forest and other wooded land (FOWL) protected to conserve biodiversity, landscapes and specific natural elements stood at 12.5% for biodiversity conservation and 8.6% for protection of landscapes and specific natural elements[163].

The share of irrigated areas stood at 5.9% of total UAA in 2013. The volume of water applied to soils for irrigation purposes was 39.9 billion m^3 in 2010, with a 28.9% share of water abstracted in agriculture for irrigation purposes in total gross abstraction[164]. A

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153 CAP context indicator C.18 Agricultural area.

154 CAP context indicator C.31 Land cover.

155 CAP context indicator C.32Areas facing natural and other specific constraints (ANCs).

156 CAP context indicator C.33 Farming intensity.

157 Extensive grazing: livestock raised on food that comes mainly from natural grasslands, shrublands, woodlands, wetlands, and other natural landscapes.

158 CAP context indicator C.34 Natura 2000 areas.

159 CAP context indicator C.35 Farmland birds index. The indicator is a composite index measuring the rate of change in the occurrence of common bird species that are dependent on farmland for feeding and nesting and are not able to thrive in other habitats.

160 Data from European Butterfly Monitoring Scheme. https://butterfly-monitoring.net/.

161 CAP context indicator C.36 Conservation status of agricultural habitats (grassland).

162 CAP context indicator C.37 High nature value farming.

163 CAP context indicator C.38 Protected forest.

164 CAP context indicator C.39 Water abstraction in agriculture and C.20 Irrigated land.
Note: the volume of water actually used in agriculture (consumed by animals or evapotranspirated by crops) differs from the water abstractions because of the efficiencies in conveyance and application and these factors are highly variable across Member States, regions and sub-sectors.

significant difference persisted between southern and northern Member States, with Spain, Italy, Greece, Portugal and France accounting for over 96% of the total water used for irrigation in the EU. Those countries also showed higher percentages than average of irrigated land (except France): 19.8% for Greece, 12.8% Spain, 12.7% Portugal and 5.6%, France[165].

Water quality in terms of gross nutrient balance was, in 2013, characterised by 49 kg Nitrogen/hectare/year for the potential surplus of nitrogen on agricultural land and 2 kg Phosphorus/hectare/year for the potential surplus of phosphorus on agricultural land. The share of monitoring sites of nitrates in groundwater with a high quality stood at 74.1% in 2012, compared to 14.2% with moderate quality and 11.7% with poor quality, and for surface water at 56.9%, 31.7% and 11.4% respectively[166]. It was observed in 2013, that the pressure from agriculture was decreasing, although not uniformly, in terms of numbers of animals and consumption of inorganic fertilisers, continuing a long-term trend[167].

Soil organic carbon, the major component of soil organic matter, is extremely important in all soil processes, influencing its structure, aggregate stability, nutrient availability, water retention and resilience. The total estimates of organic carbon content in arable land stood at 14 016.6 mega tons in 2012 with a mean organic carbon content of 43.3 g/kg[168].

An estimated 32-36% of European subsoils have high or very high susceptibility to compaction[169]. About 23% of soils in the EU-28 are estimated to have critically high densities in their subsoils, indicating compaction[170].

Around 45% of the mineral soils in Europe have low or very low organic carbon content (0–2 per cent organic carbon)[171].

Most EU soils are at risk for soil microorganisms, fauna and biological functions (Orgiazzi et al., 2016).

In 2013, 24.5% of farms produced at least 3 crops, with 10.9% of farms produced 3 crops and 13.6% above 3 crops[172].

The share of estimated agricultural area affected by moderate to severe water erosion (>11 t/ha/year) stood at 6.7% of total agricultural area in 2009[173].

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165 CAP context indicator C.20 Irrigated land.

166 CAP context indicator C.40 Water quality, corresponding to CAP impact indicator IMP_11.

167 Report on the implementation of Council Directive 91/676/EEC for the period 2008–2011. (COM(2013) 683 final).

168 CAP context indicator C.41 Soil organic matter in arable land, corresponding to CAP impact indicator IMP_12.

169 Jones, A., Panagos, P., Barcelo, S., Bouraoui, F., Bosco, C., Dewitte, O., Gardi, C., Erhard, M., Hervás, J., Hiederer, R., Jeffery, S., Lükewille, A., Marno, L., Montanarella, L., Olazábal, C., Petersen, J.-E., Penizek, V., Strassburger, T., Tóth, G., Van Den Eeckhaut, M., Van Liedekerke, M., Verheijen, F., Viestova, E. and Yigini, Y. (2012) The State of Soil in Europe , Luxembourg: Publications Office of the European UnionA contribution of the JRC to the European Environment Agency's Environment State and Outlook Report - SOER 2010).

170 Schjønning, P., Akker, J., Keller, T., Greve, M., Lamandé, M., Simojoki, A., Stettler, M., Arvidsson, J. and Breuning-Madsen, H. (2015) 'Driver-Pressure-State-Impact-Response (DPSIR) Analysis and Risk Assessment for Soil Compaction - A European Perspective', Advances in Agronomy, 133, pp. 183-237.

171 FAO and ITPS. 2015. Status of the World's Soil Resources; http://www.fao.org/3/bc590e/bc590e.pdf.

172 CAP result indicator RPI_11 Crop diversity.

173 CAP context indicator C.42 Soil erosion by water.

ANNEX 6: INFORMATION COMPLEMENTING CHAPTER 3

The CAP control and sanction system

The greening payment is calculated based on the area determined (or the area declared if it is less than the area determined). In order to receive the greening payment the beneficiary has to respect certain requirements related to greening practices referred to in Articles 44, 45 and 46 of Regulation (EU) No 1307/2013[174]. These requirements concern crop diversification, permanent grassland and ecological focus area. Beneficiaries that comply with certain thresholds referred to in Article 44 and 46 are exempt from the greening requirements.

Article 31 of Regulation (EU) No 809/2014[175] foresees different samples for the purpose of the on-the-spot controls (OTSC) with regards to the greening payment. In general, 5% of all beneficiaries required to observe greening practices should be checked each year. However, there are also other cases, such as the control sample of 3% of beneficiaries who are exempted from the greening requirements.

In case non-compliances with the greening requirements are detected during a control, a reduction in the greening payment is applied. More specifically, Regulation (EU) No 640/2014[176]

- Article 24 stipulates that if a non-compliance concerning the crop diversification requirement is determined, the area to be used for the calculation of the greening payment shall be reduced by 50% of the total area of arable land determined multiplied by the ratio of difference.
- Article 25 stipulates that if a non-compliance concerning the permanent grassland requirement is determined, the area to be used for the calculation of the greening payment shall be reduced by the area determined as non-compliant with the requirements.
- Article 26 stipulates that if EFA required exceeds the EFA determined, the area to be used for the calculation of the greening payment shall be reduced by 50% of the total arable land determined multiplied by the ratio of difference.
- Article 27 stipulates that the sum of the reductions expressed in hectares shall not exceed the total number of hectares of arable land determined. The total reduction shall not exceed the greening payment.

[174] Regulation (EU) No 1307/2013 of the European Parliament and of the Council of 17 December 2013 establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy and repealing Council Regulation (EC) No 637/2008 and Council Regulation (EC) No 73/2009; OJ L 347, 20.12.2013, p. 608–670.

[175] Commission Implementing Regulation (EU) No 809/2014 of 17 July 2014 laying down rules for the application of Regulation (EU) No 1306/2013 of the European Parliament and of the Council with regard to the integrated administration and control system, rural development measures and cross compliance; OJ L 227, 31.7.2014, p. 69–124.

[176] Commission Delegated Regulation (EU) No 640/2014 of 11 March 2014 supplementing Regulation (EU) No 1306/2013 of the European Parliament and of the Council with regard to the integrated administration and control system and conditions for refusal or withdrawal of payments and administrative penalties applicable to direct payments, rural development support and cross compliance; OJ L 181, 20.6.2014, p. 48–73.

In addition, administrative penalties can also apply as regards the greening payment further to the above-mentioned reductions.

Article 28 of Regulation (EU) No 640/2014 stipulates that if the area to be used for the calculation of the greening payment differs from the area to be used for the calculation of the greening payment after application of reduction,

- the greening payment shall be calculated on this latter area reduced by twice the difference established if that difference is more than either 3% or two hectares, but no more than 20% of the area to be used for the calculation of the greening payment after application of reduction.
- If the difference is more than 20%, no aid shall be granted.
- If the difference is more than 50%, no aid shall be granted. Moreover, the beneficiary shall be subject to an additional penalty equal to the amount of aid corresponding to the difference between the area to be used for the calculation of the greening payment and the area to be used for calculation of the greening payment after application of reduction.
- If the beneficiary as a result of the on-the-spot-check, contrary to his declaration is deemed to be non-exempt from the greening requirements, the area to be used for the calculation of the greening payment after application of reduction shall be further reduced by10 %.

ANNEX 7: TABLES AND FIGURES COMPLEMENTING CHAPTER 5

Table 13 Common agricultural policy budget allocations 2014-2020 (in million EUR)

Member States	Direct payments	Rural development	Total CAP budget
Belgium	3 603	648	**4 251**
Bulgaria	5 106	2 367	**7 472**
Czech Republic	5 985	2 306	**8 291**
Denmark	6 044	919	**6 963**
Germany	34 534	9 446	**43 980**
Estonia	839	823	**1 663**
Ireland	8 507	2 191	**10 697**
Greece	14 808	4 718	**19 526**
Spain	34 634	8 297	**42 931**
France	51 354	11 385	**62 739**
Croatia	1 482	2 026	**3 508**
Italy	26 850	10 444	**37 294**
Cyprus	351	132	**484**
Latvia	1 452	1 076	**2 527**
Lithuania	3 104	1 613	**4 717**
Luxembourg	234	101	**335**
Hungary	8 932	3 431	**12 362**
Malta	37	97	**134**
Netherlands	5 223	765	**5 988**
Austria	4 850	3 938	**8 787**
Poland	23 313	8 698	**32 010**
Portugal	4 105	4 058	**8 163**
Romania	11 638	8 128	**19 766**
Slovenia	960	838	**1 797**
Slovakia	3 016	1 560	**4 576**
Finland	3 662	2 380	**6 042**
Sweden	4 866	1 764	**6 630**
UK	22 283	5 200	**27 483**

Source: European Commission

Table 14. Expenditure on relevant environmental measures 2014-2020 (in million EUR)

Member State	2014	2015	2016	2017	2018	2019	Total
Greening							
European Union 28		11561.04	11767.1	11774.6	11750.9		46853.70
Belgium		151.93	147.43	145.80	141.59		586.75
Bulgaria		233.56	232.15	233.93	233.38		933.01
Czechia		246.99	249.94	248.02	254.41		999.36
Denmark		256.58	249.81	246.10	244.42		996.92
Germany		1437.50	1431.84	1422.27	1414.44		5706.04
Estonia		32.95	33.41	35.91	39.11		141.39
Ireland		357.15	358.76	352.64	354.72		1423.27
Greece		510.10	518.61	525.57	521.45		2075.73
Spain		1355.97	1389.70	1404.78	1394.88		5545.34
France		2061.13	2147.15	2096.95	2015.33		8320.57
Croatia		52.96	59.56	71.33	82.47		266.32
Italy		1039.28	1044.08	1018.39	1035.47		4137.22
Cyprus		14.94	14.90	14.78	14.44		59.07
Latvia		52.09	59.55	66.70	73.67		252.01
Lithuania		122.59	130.32	137.28	137.99		528.17
Luxembourg		9.76	9.90	9.87	9.77		39.30
Hungary		380.65	376.51	381.81	379.34		1518.32
Malta		0.44	0.46	0.50	0.53		1.93
Netherlands		210.82	212.92	208.37	196.25		828.36
Austria		198.30	201.22	200.07	200.92		800.50
Poland		845.38	859.43	871.38	887.36		3463.55
Portugal		158.79	162.65	165.97	169.21		656.62
Romania		397.64	425.36	450.96	474.58		1748.54
Slovenia		40.80	40.26	40.33	39.82		161.20
Slovakia		128.02	129.18	130.97	130.96		519.13
Finland		151.90	152.19	154.51	154.60		613.20
Sweden		199.68	202.83	205.51	205.11		813.13
UK		913.14	927.01	933.89	944.71		3718.76
M4 - Investments							
European Union 28	219.67	981.60	1635.73	2364.37	2813.94	1554.93	7795.63
Belgium	29.14	8.72	6.04	24.85	32.44	16.43	72.05
Bulgaria		15.69	55.22	64.53	76.79	35.71	212.22
Czechia		6.42	34.47	74.71	80.35	29.40	195.95
Denmark	2.41	19.28	28.82	26.49	37.56	7.87	112.13
Germany	18.89	49.75	118.75	132.66	152.79	97.54	453.95
Estonia		24.22	27.78	39.25	35.84	12.03	127.08
Ireland	4.63	9.45	14.27	31.88	40.22	18.34	95.82
Greece		61.33	88.02	61.39	42.92	40.77	253.67
Spain	5.99	78.41	109.29	205.81	351.96	248.52	745.47
France	17.86	74.75	108.73	248.28	275.19	145.81	706.95
Croatia		5.01	30.33	89.04	69.23	46.80	193.60
Italy	5.31	137.80	131.15	206.38	341.04	222.50	816.37

Member State	2014	2015	2016	2017	2018	2019	Total
Cyprus		1.53	0.19	1.68	7.12	3.79	10.52
Latvia	5.43	31.84	55.28	59.73	60.95	26.36	207.79
Lithuania	0.16	73.01	120.17	77.23	39.81	25.84	310.21
Luxembourg			0.72	4.54	3.82	2.12	
Hungary		27.10	3.47	76.00	176.92	86.79	283.50
Malta				6.47	14.97	7.19	21.44
Netherlands		1.18	11.22	19.75	24.44	14.78	56.60
Austria		37.01	58.27	65.41	62.56	37.06	223.24
Poland		1.13	51.02	191.51	224.53	112.22	468.19
Portugal	92.28	136.61	161.61	145.21	156.67	72.34	600.09
Romania		77.17	267.60	277.64	191.49	89.72	813.91
Slovenia	0.31	9.64	3.45	20.34	30.34	14.12	63.77
Slovakia		14.16	39.12	63.70	58.66	28.52	175.63
Finland		14.42	30.38	37.05	36.66	17.01	118.50
Sweden		1.76	18.25	18.09	20.08	12.29	58.17
United Kingdom	37.26	64.21	62.11	94.77	168.62	83.02	389.71
M10 - AECM							
European Union 28	1367.57	1748.39	2083.04	2253.60	2506.62	1848.81	8591.64
Belgium	22.14	11.55	11.14	17.15	17.04	0.21	56.88
Bulgaria		21.75	30.79	33.46	23.77	10.16	109.77
Czechia	106.65	84.08	93.30	98.31	92.71	55.49	368.40
Denmark		9.73	17.30	18.48	19.09	5.51	64.61
Germany	95.49	250.83	293.94	291.25	310.57	257.10	1146.59
Estonia	18.07	19.96	21.51	25.48	25.42	24.92	92.37
Ireland	155.23	72.13	122.46	147.61	146.07	119.04	488.27
Greece		1.17	32.21	21.78	54.25	45.46	109.41
Spain	3.39	65.07	145.87	143.82	150.92	45.76	505.68
France	158.97	19.19	0.03	194.99	331.59	166.38	545.80
Croatia		1.90	3.14	3.87	7.06	0.73	15.96
Italy		68.19	154.82	173.53	203.11	134.40	599.66
Cyprus		0.20	6.56	2.39	5.41	1.02	14.57
Latvia	6.04	6.06	7.22	8.25	9.26	9.28	30.79
Lithuania		6.14	6.23	6.11	9.26	6.87	27.74
Luxembourg	3.82	2.85	3.37	4.97	5.61	4.41	16.80
Hungary		13.55	126.65	119.07	114.71	79.28	373.99
Malta		0.17	0.51	0.54	0.47	1.20	1.69
Netherlands	28.72	28.66	40.94	44.61	49.85	61.03	164.06
Austria	189.45	131.85	141.27	146.24	145.72	108.43	565.07
Poland		115.23	127.35	117.41	111.69	104.07	471.67
Portugal	11.60	130.22	122.64	120.16	116.78	105.83	489.80
Romania		41.68	113.04	99.72	99.57	98.54	354.02
Slovenia	21.50	18.30	21.76	22.61	22.99	0.00	85.65
Slovakia		11.18	14.00	14.79	15.18	8.06	55.15
Finland	136.18	107.95	100.56	102.41	101.16	85.92	412.08
Sweden	70.90	44.13	29.65	42.87	50.29	70.52	166.94
United Kingdom	339.41	464.67	294.78	231.71	267.06	239.17	1258.21

Member State	2014	2015	2016	2017	2018	2019	Total
M11 - Organic farming							
European Union 28	216.10	579.20	951.29	1159.49	1333.16	808.46	4023.14
Belgium	0.51	5.94	6.94	8.14	7.87	0.04	28.90
Bulgaria		10.82	26.74	24.57	18.17	0.56	80.30
Czechia	43.24	35.19	36.79	40.46	39.74	36.78	152.18
Denmark		15.29	19.03	26.41	30.73	13.60	91.46
Germany	59.08	133.72	164.18	185.94	216.96	129.49	700.79
Estonia		9.81	10.77	13.92	13.78	14.86	48.28
Ireland		1.76	2.88	5.20	4.23	3.83	14.07
Greece		2.29	111.14	104.14	77.74	61.24	295.31
Spain	0.27	39.67	87.95	111.49	110.13	32.88	349.25
France				116.05	269.93	129.12	385.98
Croatia		22.12	22.39	23.37	28.06	0.58	95.94
Italy		41.14	175.69	204.73	206.48	152.95	628.04
Cyprus			1.60	0.99	1.96	0.68	4.54
Latvia	14.19	16.09	19.13	18.97	18.96	18.99	73.14
Lithuania		23.49	32.17	29.37	27.17	0.11	112.20
Luxembourg		0.08	0.30	0.29	0.33	0.32	1.01
Hungary			25.13	16.21	16.10	12.15	57.44
Malta					0.00	0.00	0.00
Austria	48.62	49.72	54.60	58.83	61.46	49.18	224.62
Poland		49.34	48.10	43.93	43.38	38.76	184.75
Portugal	0.45	25.02	22.76	22.72	21.63	20.24	92.14
Romania		8.43	30.96	26.97	35.41	39.25	101.77
Slovenia	7.50	5.71	6.60	6.85	7.22	0.00	26.38
Slovakia		11.97	12.92	13.44	12.61	7.74	50.94
Finland	14.23	28.56	21.24	23.40	23.59	0.33	96.80
Sweden	26.60	37.74	5.06	25.67	29.60	37.71	98.07
United Kingdom	1.40	5.28	6.22	7.42	9.92	7.08	28.85
M12 – Natura 2000							
European Union 28	34.97	60.01	69.90	83.10	93.14	39.82	306.15
Belgium	1.01	0.31	1.20	1.45	2.63	2.36	5.60
Bulgaria		18.47	16.72	17.19	17.67	0.01	70.05
Czechia		0.32	0.34	0.37	0.37	0.36	1.40
Germany	3.83	3.77	8.88	9.29	9.48	5.87	31.42
Estonia	3.49	3.42	3.42	3.64	3.64	3.69	14.12
Ireland	24.81	3.58	2.10	0.46	0.40	0.03	6.54
Spain		0.04	0.10	4.37	3.26	2.73	7.77
Italy		0.35	0.27	6.46	15.44	2.43	22.52
Latvia	1.82	2.09	2.33	2.50	2.73	2.64	9.66
Lithuania		2.15	1.99	2.21	2.34	2.37	8.68
Luxembourg				0.01	0.03	0.00	0.04
Hungary		17.73	24.73	27.54	26.66	9.89	96.66
Austria		0.00	0.00	0.00	0.60	0.44	0.61
Portugal		7.17	7.05	7.08	7.18	6.86	28.48
Slovakia		0.63	0.76	0.52	0.70	0.13	2.61

Member State	2014	2015	2016	2017	2018	2019	Total
M13-ANC							
European Union 28	1698.03	1706.46	3321.30	2737.25	2663.02	2359.84	10428.03
Belgium	6.91	2.29	2.20	2.28	2.27	2.69	9.04
Bulgaria		32.58	33.61	37.09	37.49	34.87	140.77
Czechia	42.85	66.58	64.84	69.89	125.48	128.61	326.80
Germany	88.60	126.21	140.62	143.93	135.44	146.79	546.19
Ireland	193.24	118.09	102.76	100.42	87.75	27.07	409.02
Greece		112.67	207.73	226.19	139.72	131.36	686.31
Spain	3.03	71.98	99.98	87.93	89.91	80.20	349.80
France	426.42	41.81	1443.78	774.91	794.85	824.69	3055.36
Croatia		39.21	42.62	42.83	44.81	45.90	169.46
Italy	9.71	64.29	165.36	164.57	151.03	97.13	545.25
Cyprus		4.21	4.46	3.17	3.16	3.11	15.00
Latvia	28.74	35.77	37.13	55.23	42.37	0.00	170.49
Lithuania	39.42	39.97	48.30	48.62	34.01	45.45	170.91
Luxembourg	8.02	3.95	3.89	3.88	3.82	4.05	15.54
Hungary		8.06	7.38	8.97	4.96	0.13	29.37
Malta		0.42	1.55	1.50	1.47	1.44	4.95
Austria	127.36	125.19	127.25	126.01	125.37	93.30	503.82
Poland	155.89	193.49	194.94	198.99	195.07	213.78	782.49
Portugal	119.75	136.31	119.45	115.90	114.39	104.45	486.05
Romania		207.98	222.30	217.05	221.62	217.60	868.95
Slovenia	0.00	31.21	31.40	31.56	31.65	31.82	125.82
Slovakia	62.34	47.08	47.86	47.93	47.46	37.02	190.32
Finland	258.85	97.21	97.55	96.31	96.21	14.47	387.28
Sweden	31.39	85.44	19.27	55.08	49.76	72.31	209.54
United Kingdom	95.51	14.47	55.08	77.02	82.95	1.60	229.52

Source: DG AGRI

Table 15 Summary of agricultural threats and opportunities from key EU species/taxa, and range of possible land management response

Key EU species or group	EU Member States with populations	Farming system(s) affected	Nature of the threat or opportunity	Range of possible responses from land managers
Grey Wolf (*Canis lupus*)	20 Member States; BG, CZ, DE, EE, EL, ES, FR, HR, IT, LV, LT, HU, AT, PL, PT, RO, SI, SK, SE	Flocks/herds grazing in pastures or woodland.	Livestock predation – mainly sheep and goats but also calves, colts. Reindeer in FI and SE. May also prey on species which can be agricultural pests such as boar.	*Defensive:* illegal killing or licensed hunting: abandonment of semi-natural pastures. *Adaptive:* shepherding with guard dogs, fencing, night shelters, scaring; national or regional carnivore management plans.
Brown Bear (*Ursus arctos*)	15 Member States: BG, EE, EL, ES, FR, IT, LV, AT, PL, RO, SE, SK, SE	Wide range of systems including outdoor livestock, beehives, field crops, grassland, orchards and vineyards.	Predation of livestock and other domestic animals - sheep, goats, cattle, horses, pigs, donkeys, deer rabbits, chickens, beehives, dogs. In searching for other food sources, damage to field crops, grassland and silage bags, orchards, feed stores, buildings and fences.	

Key EU species or group	EU Member States with populations	Farming system(s) affected	Nature of the threat or opportunity	Range of possible responses from land managers
Eurasian Lynx (*Lynx lynx*)	17 Member states BG, CZ, DE, EE, HR, IT, LV, LT, HU, AT, PL, SI, SK, FI, SE	Free ranging sheep flocks grazing in open pastures, also reindeer in FI and SE.	Livestock predation.	
Iberian Lynx (*Lynx pardinus*)	ES, PT	Sheep attacks cause most economic losses, but poultry attacks are more frequent.	Livestock predation.	
Wolverine (*Gulo gulo*)	FI, SE	Free ranging reindeer herds.	Livestock predation.	
Greylag Goose (*Anser anser*) and Barnacle Goose (*Branta leucopsis*) Red-breasted Goose (Branta ruficollis)	Greylag goose widespread, mainly in BE, DK, DE, HU, NL, AT, FI, SE, UK Barnacle Goose winters in DE, IE, NL, UK	Grass and arable crops (winter cereals, field beans, oilseed rape, root crops).	Grazing/trampling of different crops throughout year.	*Defensive:* licensed hunting; growing unpalatable crops. *Adaptive:* scaring, sacrificial crops, non-disturbance grazing areas, scaring elsewhere.
Crane (*Grus grus)*		Arable crops (winter cereals, oilseed rape, maize, sunflower) and vegetable crops.	Feeding on crops.	
Arable weeds	Mainly in south-eastern Europe, in traditional, extensively managed arable crops in HNV mosaic landscapes.	Arable, mixed.	Decline in extensively managed, low input arable cropping.	*Defensive:* Herbicide use on crops and field margins. *Adaptive:* conservation arable crops/margins (no herbicides).
Wild pollinators	All Member States	Arable crops (except cereals, rice and soya); fruit, legume and some vegetable crops.	Use of broad spectrum pesticides. Lack of habitat suitable for feeding, breeding and over-wintering, near to target crops.	*Adaptive:* field margins, hedgerows, flower-rich strips, species-rich grassland, heathland and scrub and woodland edges managed without pesticides.
Wild bio-logical control agents	All Member States	Arable and fruit crops.		

Source: evaluation support study on biodiversity[177]

[177] See footnote 11.

Table 16 Member State strategic priorities for biodiversity and CAP measures implemented

Priority identified in NBSAP or PAF	CAP measures	DE (BW)	FR (CVdL)	HR	HU	IE	LV	NL	PT	RO	SK
Protection and maintenance of pasture and grassland habitats and species	Ruminant VCS with stocking density limits; ANC; AECM support for grazing, cutting and mowing	X	X	X	X	X	X	X	X	X	X
Protection and maintenance of forest habitats and species	Agroforestry, afforestation and forest environment measures	X	X	X	X	X	X		X	X	X
Development and maintenance of the Natura 2000 network (agriculture)	Use of M7.1 and M12.1	X	X	X	X	X	X	X	X		X
Development and maintenance of the Natura 2000 network (forestry)	Use of M7.1 and M12.2	X	X		X	X	X		X		X
Protection and maintenance of high nature value farmland	Adequate HNV map plus targeted CAP measures	X	X		X	X	X		X	X	X
Minimisation of negative external impacts of agriculture on biodiversity (e.g. input reduction)	M11, AECM low input options	X	X	X		X		X	X		X
Tackling invasive species	GAEC 7 option, AECM, M4.4	X	X	X	X	X	X	X	X	X	
Preserving and managing plant and genetic resources	VCS, M10.2		X	X	X	X			X	X	
Restoration and maintenance of peatlands and wetlands	M4.4, AECM options	X				X	X	X	X	X	
Farmland birds	AECM	X	X		X	X			X	X	X

Source: evaluation support study on biodiversity[178] on the basis of National Biodiversity Strategies and Actions; Prioritised Action Frameworks for Natura 2000; Rural Development Programmes

Legend:

- Green: uses most/all CAP measures relevant to priority.
- Red: uses few/none.
- White: priority not identified in the case study National Biodiversity Strategies and Actions or Prioritised Action Frameworks for Natura 2000.

[178] See footnote 11.

Table 17 Summary of the theoretical coherence assessment of CAP instruments and measures under general objective related to biodiversity

Measure	FAS	XC	BPS/ SAPS	CD	PG	ESPG	EFA	VCS	Redi st.	SFS	Cott on	F/V OPs	M1	M2	M3	M4	M5	M7	M8	M10	M11	M12	M13	M15	M16	M19
FAS																										
XC																										
BPS/SAPS					ER		PC																			
CD																										
PG																										
ESPG																										
EFA																										
VCS																										
Redist.																										
SFS																										
Cotton																										
F/V OPs																										
M1																										
M2																										
M3																										
M4																										
M5																										
M7																										
M8																										
M10																										
M11																										
M12																										
M13																										
M15																										
M16																										
M19																										

Source: Study on biodiversity (based on expert judgement)

Legend: Green=positive; red=conflict Amber= mixed i.e. potential synergies, but also conflicts; blue= neutral, XC=cross-compliance referring to SMRs 2 and 3 and GAEC 7, ER= eligibility rules, PC permanent crops, F/V Ops fruit and vegetables operational programmes

Table 18 Coherence of CAP instruments and measures with the water-related specific objectives for 'sustainable management of natural resources and climate action'

CAP measures and instruments	Sustainable Management of Natural Resources and Climate Action			
	Improve water (qualitative) management, including fertiliser and pesticide management	Increase efficiency in water use by agriculture	Pursue climate change mitigation and adaptation	Provide public goods
Horizontal measures				
Cross-compliance	+1	+1	+1	+1
Farm advisory systems	+1	+1	+1	+1
Pillar II measures				
Knowledge transfer and capacity-building measures (M1, M2 and M16)	+1	+1	+1	+1
Investment measures (M4)	M	M	M	M
Forestry measures (M8, M15)	+1	+1	+1	+1
Land management measures (M10, M12 and M15)	+1	+1	+1	+1
Organic farming (M11)	+1	+1	+1	+1
Areas facing natural constraints (M13)	0	0	0	0
LEADER (M19)	N/A	N/A	N/A	N/A
Pillar I measures				
Basic payments	0	0	0	0
Greening – Crop diversification	+1	+1	+1	+1
Greening – Ecological Focus Areas (EFAs)	+1	+1	+1	+1
Greening – permanent grassland	M	M	M	M
Voluntary Coupled Support (VCS)	M	M	M	M
CMO sector-specific support	N/A.	M	M	M

Source: Study on water (based on EU legislation, literature review and case-study reports)

Legend

- Red (-1) = contradictions or competition;
- Blue (M) =mixed, depends on Management Authorities' implementation choices;
- Yellow (0) = neutrality, or no particular association; and
- Green (+1) = a complementary or synergistic relationship.

Table 19 Coherence of CAP measures with the Birds and Habitats Directives and actions under Target 3 of the EU Biodiversity Strategy

		Biodiversity strategy Target 3				
Measure	**Birds & Habitats Directives**	**Action 8: Enhance CAP direct payments**	**Action 9: Better target Rural Development**	**Action 10: genetic diversity**	**Action 11: Encourage forest conservation**	**Action 12: Biodiversity measures in forest plans**
Horizontal measures - Regulation (EU) No 1306/2013						
FAS	**M**	**M**		**+1**	**+1**	**+1**
Cross-compliance (SMRs and GAEC)	**+1**	**+1**	**+1**	**0**	NA	NA
Direct Payment Regulation - Regulation (EU) No 1307/2013						
BPS & SAPS	**M**	**M**	**0**	**+1**	NA	NA
Redistributive payment	**M**	**M**	**0**	**0**	NA	NA
Greening: Crop diversification	**M**	**+1**	**0**	NA	NA	NA
Greening: PG ratio	**+1**	**+1**	**0**	**0**	NA	NA
Greening: ESPG	**+1**	**+1**	**0**	**+1**	NA	NA
Greening: EFAs	**M**	**+1**	**0**	**0**	NA	NA
VCS	**M**	**M**	**0**	**+1**	NA	NA
SFS	**M**	**M**	**0**	**+1**	NA	NA
Crop-specific payment for cotton	-	-	**0**	NA	NA	NA
Common Market Organisation - Regulation (EU) No 1305/2013						
Operational programmes in the fruit and vegetables sector	-	-	**0**	NA	NA	NA
Rural Development Regulation - Regulation (EU) No 1305/2013						
M1 Knowledge transfer and information actions	**M**	**M**	**M**	**+1**	**+1**	**+1**
M2 Advisory services, farm management and farm relief services	**M**	**M**	**M**	**+1**	**+1**	**+1**
M3 Quality schemes	**M**	**0**	**M**	**+1**	NA	NA
M4 Investments in physical assets	**M**	**0**	**M**	**+1**	NA	NA
M5 Restoring and prevention actions after natural disasters	**M**	**0**	**M**	NA	**+1**	**0**

Measure	Birds & Habitats Directives	Biodiversity strategy Target 3				
		Action 8: Enhance CAP direct payments	Action 9: Better target Rural Development	Action 10: genetic diversity	Action 11: Encourage forest conservation	Action 12: Biodiversity measures in forest plans
M7 Basic services and village renewal	**M**	**0**	**M**	**+1**	NA	**+1**
M8 Forest investments	**M**	NA	**M**	NA	**M**	**M**
M10 Agri-environment-climate	**+1**	**0**	**+1**	**+1**	NA	NA
M11 Organic farming	**+1**	**0**	**+1**	**+1**	NA	NA
M13 ANC	**M**	**M**	**0**	**+1**	NA	NA
M12 Natura 2000 and WFD payments	**+1**	**0**	**+1**	**+1**	**+1**	**+1**
M15 Forest-environment-climate	**+1**	NA	NA	NA	**+1**	**+1**
M16 Cooperation	**+1**	**0**	**+1**	**+1**	**+1**	**+1**
M19 LEADER	**+1**	**0**	**+1**	**+1**	NA	NA

Source: evaluation support study on biodiversity[179]

Note: Assessments are only made where the measure has the potential to have an effect

Actions under Target 3:

- Action 8: Enhance CAP direct payments to reward environmental public goods such as crop rotation and permanent pastures; improve cross-compliance standards for GAEC (Good Agricultural and Environmental Conditions) and consider including the Water Framework in these standards.
- Action 9: Better target Rural Development to biodiversity needs and develop tools to help farmers and foresters work together towards biodiversity conservation.
- Action 10: Conserve and support genetic diversity in Europe's agriculture.
- Action 11: Encourage forest holders to protect and enhance forest biodiversity.
- Action 12: Integrate biodiversity measures such as fire prevention and the preservation of wilderness areas in forest management plans.

Legend:

-1 (red) = contradicts/competes; 0 (blue) = neutral/no particular association;

+1 (green) = positive or synergistic; M (amber) = mixed;

- (white): inconclusive assessment; NA (white): not applicable.

[179] See footnote 11.

Table 20 Coherence of CAP instruments and measures with the EU soil-related objectives[180]

EU environmental and climate policies	CAP instrument or measure		
	Designed to address sustainable soil management[(1)]	**With potential direct effects on sustainable soil management [(2)]**	**With potential indirect effects on sustainable soil management [(3)]**
Cross-cutting policies (non-binding)			
7th Environmental Action Plan (7th EAP)	synergetic	synergetic	neutral/limited
Soil Thematic Strategy	synergetic	synergetic	neutral/limited
Diffuse pollution & water management policies (binding)			
Water Framework Directive	synergetic	synergetic	neutral/limited
Sewage Sludge Directive	neutral/limited	neutral/limited	neutral/limited
Floods Directive	synergetic	synergetic	neutral/limited
Nitrates Directive	neutral/limited	mixed/conflicting	neutral/limited
Sustainable Use of Pesticides Directive	synergetic	mixed/conflicting	neutral/limited
Biodiversity & nature protection policies (binding)			
Habitats and Birds Directive	synergetic	synergetic	neutral/limited
EU Biodiversity Strategy	synergetic	synergetic	neutral/limited
Air & climate policies (binding)			
NEC Directive	synergetic	mixed/conflicting	neutral/limited
LULUCF Decision.	synergetic	mixed/conflicting	neutral/limited
Effort Sharing Decision	synergetic	mixed/conflicting	neutral/limited

Source: evaluation support study on soil[181] (adaptation)

Notes:

(1) GAECs 4, 5 and 6; Greening – Crop diversification; M8.1, M8.2, M8.5, M10.1, M11,

(2) GAECs 1 and 3 and SMR1 and SMR10, Greening – EFAs and the maintenance of permanent grassland and the fruits and vegetables environmental measures; M4.1, M4.3, M4.4;

(3) Other sector-specific measures, M1, M2, M5, M8.3, M8.4, M12, M15.1 and EIP-AGRI

[180] The Fertilising Product Regulation 2019/1009 does not yet apply, therefore analysis should not take it into consideration.

[181] See footnote 12.

Table 21 Coherence of CAP instruments and measures with the key EU key water and environmental policies and strategies

CAP measures and instruments	Other EU Policies				
	WFD	Nitrates Directive	SUPD	Nature legislation	Biodiversity Strategy
Horizontal measures					
Cross-compliance	+1	+1	0	+1	+1
Farm advisory systems	+1	+1	0	0	0
Pillar II measures					
Knowledge transfer and capacity-building measures (M1, M2 and M16)	+1	+1	+1	0	0
Investment measures (M4 and M8)	M	+1	0	+1	+1
Land management measures (M10, M12 and M15)	+1	+1	+1	+1	+1
Organic farming (M11)	+1	+1	+1	+1	+1
Areas facing natural constraints (M13)	+1	0	0	+1	+1
LEADER (M19)	+1	0	0	+1	+1
Basic services and natural disasters (M5, M7)	+1	0	0	+1	+1
Pillar I measures					
Sector-specific support under CMO	+1	0	0	0	0
Basic payments	0	0	0	0	0
Greening – Crop diversification	+1	+1	0	0	+1
Greening – Ecological Focus Areas (EFAs)	+1	+1	0	+1	+1
Greening – permanent grassland	M	+1	0	+1	+1
Voluntary Coupled Support (VCS)	M	0	0	0	0
Other non-CAP policies					
Other non-water-targeted measures outside CAP (e.g. 0-tariff import)	-1	-1	0	0	0

Source: evaluation support study on water[182]

Legend:
Red (-1) = contradiction or competition;
Blue (M) =mixed, depends on Managing authorities implementation choices
Yellow (0) = neutrality, or no particular association; and
Green (+1) = a complementary or synergistic relationship.

[182] See footnote 13.